

SUPPLEMENT.

The Mining Journal, RAILWAY AND COMMERCIAL GAZETTE:

FORMING A COMPLETE RECORD OF THE PROCEEDINGS OF ALL PUBLIC COMPANIES.

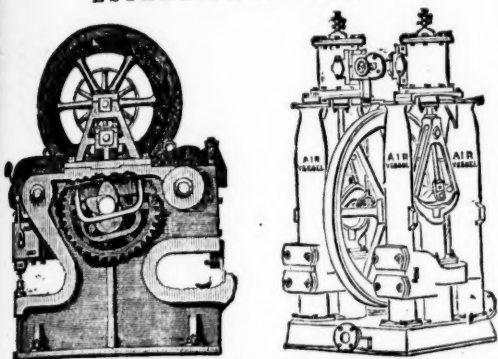
[The MINING JOURNAL is Registered at the General Post Office as a Newspaper, and for Transmission Abroad.]

No. 2179.—VOL. XLVII.

LONDON, SATURDAY, MAY 26, 1877.

PRICE (WITH THE JOURNAL) SIXPENCE.
PER ANNUM, BY POST, £1 4s.

JOHN CAMERON'S
SPECIALITIES ARE ALL SIZES OF
**Steam Pumps, Shipbuilders' Tools,
BAR SHEARS.**
ESTABLISHED 1852.



**OLDFIELD ROAD IRON WORKS,
SALFORD, MANCHESTER.**

For Excellence
and Practical Success
of Engines



Represented by
Model exhibited by
this Firm.

HARVEY AND CO.
ENGINEERS AND GENERAL MERCHANTS,
HAYLE, CORNWALL.
LONDON OFFICE,—186, GRESHAM HOUSE, E.C.

MANUFACTURERS OF
PUMPING and other LAND ENGINES and MARINE STEAM ENGINES
of the largest and most approved kinds in use, SUGAR MACHINERY,
MILLWORK, MINING MACHINERY, AND MACHINERY IN GENERAL.
SHIPBUILDERS IN WOOD AND IRON.

MANUFACTURERS OF
HUSBAND'S PATENT PNEUMATIC STAMPS.

SECONDHAND MINING MACHINERY FOR SALE,
In Good Condition, at MODERATE PRICES—viz.,

PUMPING ENGINES; WINDING ENGINES; STAMPING ENGINES;
STEAM CAPSTANS; ORE CRUSHERS; BOILERS and PITWORK of
various sizes and descriptions; and all kinds of MATERIALS required for
MINING PURPOSES.

LYON & DAVISON,
IRONFOUNDERS, ENGINEERS, &C.,
Haydon Bridge, near NEWCASTLE-ON-TYNE,
Manufacturers of

LEAD SMELTING, REDUCING, AND REFINING FURNACES,
SLAG HEARTHES, AND SMELTERS' WORK GEAR.
Plans and Estimates furnished for improved Lead or Copper Mining and
Smelting Plant.

ST. LAWRENCE ROPE WORKS,

NEWCASTLE-ON-TYNE. Established 1782.

THOMAS AND WILLIAM SMITH,

Manufacturers of all kinds of Iron, Steel, Copper, and Galvanised Wire Ropes;
Rope and Manila Ropes, &c.; Round and Flat Shaft Ropes; Crab Ropes; Guide
Ropes; Hauling Ropes; and Galvanised Signal Strand; Ship's Standing Riggings
and complete; Patent Hemp and Manila Hawseas, Warps, Corlages, Spun-yarn,
&c.; Manila Yarn for Telegraph Cables, and Flat Hemp Ropes for Driving
Rolls; Steel Plough Ropes; Fencing Wire and Stand Lightning Conductors, &c.

OFFICE—
1, QUEEN STREET, NEWCASTLE-ON-TYNE; DOCK YARD, NORTH
SHIELDS; 17, PHILPOT LANE, LONDON, E.C.
STORES—North Shields, Blackwall, Newcastle, and Tyne Dock.

**STANDARD LUBRICATING OILS
COMPANY, LIMITED.**

DARK and PALE OILS for MACHINERY, RAILWAY, and MINING
PURPOSES, from TWO SHILLINGS per gallon, and upwards.

AGENTS WANTED.

95, CANNON STREET, LONDON, E.C.

ALEX. CHAPLIN AND CO.,
CRANSTONHILL ENGINE WORKS, GLASGOW.

PATENTERS and SOLE MANUFACTURERS OF
CHAPLINS' PATENT STEAM CRANES, HOISTS,
LOCOMOTIVES, AND OTHER ENGINES AND BOILERS.

LONDON HOUSE:—

MCKENDRICK, BALL, AND CO.,
63, QUEEN VICTORIA STREET LONDON E.C.



A DIPLOMA—HIGHEST OF ALL AWARDS—given by the
Geographical Congress, Paris, 1875—M. Favre, Contractor, having
exhibited the McKean Drill alone as the MODEL BORING MACHINE
for the ST. GOTHARD TUNNEL.

SILVER MEDAL of the Highland and West of Scotland
Agricultural Society, 1875—HIGHEST AWARD.

At the south end of the St. Gothard Tunnel, where

THE MCKEAN ROCK DRILLS

Are exclusively used, the advance made during eight consecu-
tive weeks, ending February 7, was 24'90, 27'60, 24'80, 26'10,
28'30, 27'10, 28'40, 28'70 metres. Total advance of south head-
ing during January was 121'30 metres, or 133 yards.

In a series of comparative trials made at the St. Gothard Tun-
nel, the McKean Rock Drill continued to work until the pres-
sure was reduced to one-half atmosphere (7½ lbs.), showing
almost the entire motive force to be available for the blow
against the rock—a result of itself indicating many advantages.

The GREAT WESTERN RAILWAY has adopted these
Machines for the SEVERN TUNNEL; the LONDON AND
NORTH-WESTERN RAILWAY for the FESTINIOG TUN-
NEL; and the BRITISH GOVERNMENT for several Public
Works. A considerable number of Mining Companies are now
using them. Shafts and Galleries are driven at from three to
six times the speed of hand labour, according to the size and
number of machines employed, and with important saving in
cost. The ratio of advantage over hand labour is greatest
where the rock is hardest.

These Machines possess many advantages, which give them
a value unapproached by any other system of Boring Machine.

THE MCKEAN ROCK DRILL IS ATTAINING GENERAL
USE THROUGHOUT THE WORLD FOR MINING, TUN-
NELLING, QUARRYING, AND SUB-MARINE BORING.

The MCKEAN ROCK DRILLS are the most powerful—the
most portable—the most durable—the most compact—of the
best mechanical device. They contain the fewest parts—have
no weak parts—act without SHOCK upon any of the operat-
ing parts—work with a lower pressure than any other Rock
Drill—may be worked at a higher pressure than any other
—may be run with safety to FIFTEEN HUNDRED STROKES
PER MINUTE—do not require a mechanic to work them—are
the smallest, shortest, and lightest of all machines—will give
the longest feed without change of tool—work with long or
short stroke at pleasure of operator.

The SAME Machine may be used for sinking, drifting, or
open work. Their working parts are best protected against
grit and accidents. The various methods of mounting them
are the most efficient.

N.B.—Correspondents should state particulars as to
character of work in hand in writing us for information,
on receipt of which a special definite answer, with
reference to our full illustrated catalogue, will be sent.

PORTABLE BOILERS, AIR COMPRESSORS, BORING STEEL,
IRON, AND FLEXIBLE TUBING.

The McKean Drill may be seen in operation daily in London.

MCKEAN AND CO.

ENGINEERS.

OFFICES,

42 BOROUGH ROAD, LONDON, S.E.; and
5, RUE SCRIBE, PARIS.

MANUFACTURED FOR MCKEAN AND CO. BY

MESSERS. P. AND W. MACLELLAN, "CLUTHA IRONWORKS,"
GLASGOW.

The Warsop Rock Drill

(Involving an entirely new principle in Mechanical Boring)

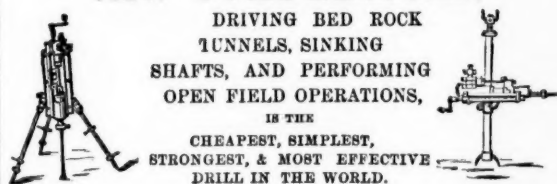
Requires only 20 lbs. steam or air-pressure.
Has only two moving parts—thus ensuring freedom from de-
rangement, and is absolutely self-feeding.
Is excessively light, and can be carried by one man, who can
with the No. 1 size (weighing only 35 lbs.) drill 40 holes
½ in. diameter and 1½ in. deep per minute, in the hardest Aber-
deen granite for splitting purposes.

WARSOP AND HILL,
HYDRAULIC AND GENERAL ENGINEERS.
NOTTINGHAM.

STEAM and HYDRAULIC WINDING and PUMPING ENGINES
of all kinds.

DUNN'S ROCK DRILL,

AND
AIR COMPRESSORS.



DRIVING BED ROCK
TUNNELS, SINKING
SHAFTS, AND PERFORMING
OPEN FIELD OPERATIONS,
IS THE
CHEAPEST, SIMPLEST,
STRONGEST, & MOST EFFECTIVE
DRILL IN THE WORLD.

OFFICE,—193, GOSWELL ROAD

(W. W. DUNN AND CO.),

LONDON, E.C.

PATENT SELF-ACTING MINERAL DRESSING MACHINE COMPANY

(LIMITED).

T. CURRIE GREGORY, C.E., F.G.S.

OFFICES,—GLASGOW: 150, ST. VINCENT STREET.

LONDON: 85, GRACECHURCH STREET, E.C.

IMPORTANT NOTICE TO MINE PROPRIETORS.

MR. GEORGE GREEN, ENGINEER, ABERYSTWTH.
SUPPLIES MACHINES under the above Company's Patents for
DRESSING all METALLIC ORES. Dressing-floors having these Machines pos-
sess the following advantages:—

- 1.—THEY ARE CHEAPER THAN ANY OTHER KIND IN FIRST OUTLAY.
- 2.—ONLY ABOUT ONE-FOURTH OF THE SPACE USUALLY OCCUPIED
BY DRESSING-FLOORS IS REQUIRED.
- 3.—FROM 60 TO 70 PER CENT. OF THE LABOUR IN DRESSING, AND
FROM 5 TO 10 PER CENT. OF ORE OTHERWISE LOST, IS SAVED.
- 4.—THEY ARE THE ONLY MACHINES THAT MAKE THE ORE CLEAN
FOR MARKET AT ONE OPERATION.

They have been supplied to some of the principal mines in the United Kingdom
and abroad—viz.,

The Greenside Mines, Patterdale, Cumberland; London Lead Company's Mines
Darlington, Colberry, Nanthead, and Bollyhope; the Stonecroft and Greyside
Mines, Hexham, Northumberland; Wanlockhead Mines, Abington, Scotland (the
Duke of Buccleuch); Bewick Partners, Haydon Bridge; the Old Darren, Esgar-
mwyn, and Ystumtuen Mines, in Cardiganshire; Mr. Beaumont's W.B. Mines,
Darlington; also Mr. Sewell, for Argentinian Copper Mines, Peru; the Brats-
berg Copper Mines, Norway, and Mines in Italy, Germany, United States of
America, and Australia, from all of whom certificates of the complete efficiency of
the system can be had.

WASTE HEAPS, consisting of refuse chads and skippings of a
former washing, containing a mixture of lead, blende, and sulphur,
DRESSED TO A PROFIT.

MR. BAINBRIDGE, C.E., of the London Company's Mines, Middleton-
in-Teesdale, by Darlington, writing on the 20th March, 1876, says—"The yearly
profit on our Nanthead waste heaps amounted last year to £500, besides the ma-
chinery being occupied for some months in dressing ore stuff from the mines. Of
course, if it had been wholly engaged in dressing wastes our returns would have
been greater; but it is giving us every satisfaction, and bringing the waste heaps
into profitable use, which would otherwise remain dormant."

MR. T. B. STEWART, Manager of the Duke of Buccleuch's Mines,
Wanlockhead, Abington, N.B., writing on 20th March, 1876, says—"I have much
pleasure in stating that a full and superior set of your Ore Dressing Machinery has
been at work at these mines for fully a month, and each day as the moving parts
become smoother, and those in charge understand the working of the machinery
better, it gives increasing satisfaction, the ore being dressed more quickly, cheaply,
and satisfactorily than by any other method."

MR. BAINBRIDGE, speaking of machinery supplied Colberry Mines,
says—"Your machinery saves fully one-half on old wages, and vastly more on the
wages we have now to pay. Over and above the saving in cost is the saving in ore,
which is a much short of 10 per cent."

GREENSIDE MINE COMPANY, Patterdale, near Penrith, say—"The
separation which they make is complete."

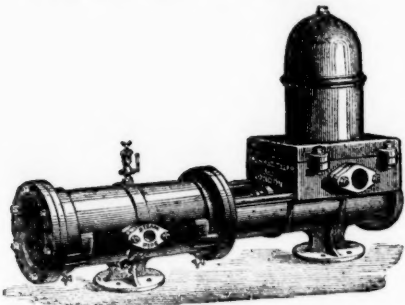
MR. MONTAGUE BEALE says—"It will separate ore, however close
the mechanical mixture, in such a way as no other machines can do."

MR. C. DODSWORTH says—"It is the very best for the purpose
and will do for any kind of metallic ores—the very thing so long needed for dress-
ing floors."

Drawings, specifications, and estimates will be forwarded on application to—
GEORGE GREEN, M.E., ABERYSTWTH SOUTH WALES.

HAYWARD TYLER & CO.

**"UNIVERSAL"
STEAM PUMP.**



1872—SILVER MEDAL,
ROYAL CORNWALL POLYTECHNIC.
1873—MEDAL FOR PROGRESS,
VIENNA EXHIBITION.
1874—GOLD MEDAL,
AGRICOLE DE LILLE.
1873—SILVER MEDAL,
MANCHESTER.
1875—BRONZE MEDAL,
LEEDS.

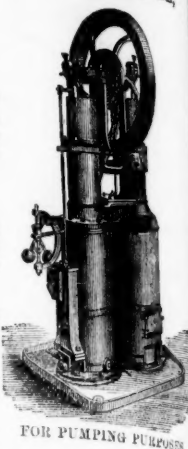
1869—The Standard—
"The action is perfectly quiet."

1873—The Engineer—
"It is a fact that, although there is a great variety of Direct-acting Steam Pumps exhibited, none that we have noticed worked so quietly as those of Messrs. Hayward Tyler and Co."

1873—Engineering—
"The 'Universal' (H. Tyler and Co.) Pump can certainly claim to be the simplest machine of its kind in the Exhibition."

1874—Griffiths' Iron Trade Exchange—
"Nothing in steam power so cheap and effectual as H. Tyler and Co.'s 'Universal' Steam Pump."

RIDER'S PATENT
HOT AIR ENGINE.



84, WHITECROSS STREET, LONDON, E.C.



BOLTS, NUTS, AND COACH SCREWS.

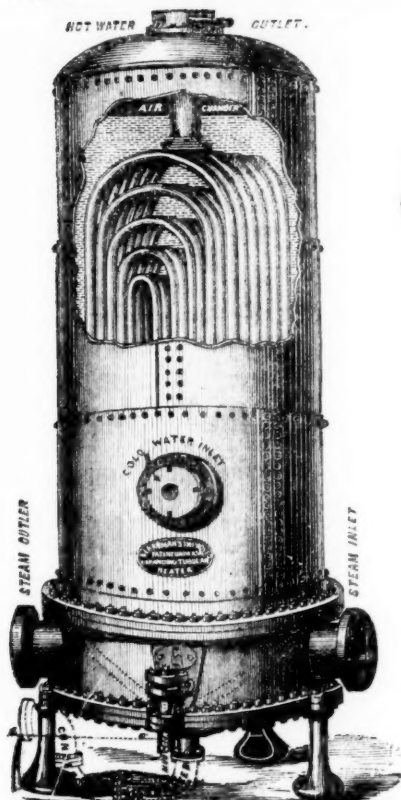
ARCHER AND HARPER,

PROVIDENCE BOLT AND NUT WORKS, THE GREEN, DARLASTON,

Manufacturers of all kinds of Shipbuilders', Engineers', Coach, Wagon, and Fish Bolts; Coach Screws; Railway Spikes and Brobs; Ho-pressed and Forged Nuts, Rivets, Washers, &c., &c.

SHIPBUILDERS' AND RAILWAY STORES' CONTRACTORS.

HAYWARD TYLER AND CO., 84, Whitecross Street, London, E.C.



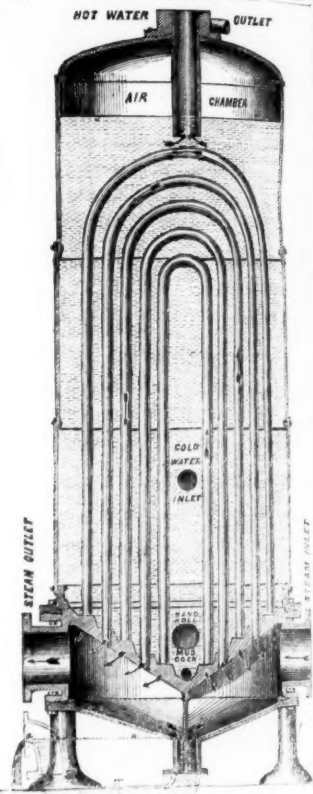
IMPORTANT.

JOSEPH WRIGHT AND CO.

(LIMITED),

NEPTUNE FORGE ENGINE AND BOILER WORKS,

TIPTON, STAFFORDSHIRE.



Having purchased the Engineering Business lately carried on by R. BERRYMAN AND CO., at 23, Congreve-street, Birmingham, and 28, Wilson-street, Finsbury-square, London, have removed the whole to their Works at TIPTON, to which place ALL COMMUNICATIONS SHOULD IN FUTURE BE ADDRESSED, and where the BERRYMAN HEATER can be seen at work, and in every stage of manufacture.

Being the SOLE MAKERS and PATENTEES of these CELEBRATED COAL SAVERS and EXHAUST STEAM UTILISERS, and having remodelled and greatly improved them, adding largely to their HEATING SURFACE and WATER CAPACITY, J. W. and Co. have put down a special plant, which includes an entire new set of improved patterns, enabling them to offer these FEED WATER HEATERS to the public at

GREATLY REDUCED PRICES.

This arrangement of BRASS TUBES of a great length giving an enormous HEATING SURFACE makes this HEATER not only the MOST POWERFUL ever invented, but its FIRST COST PER FOOT OF HEATING SURFACE IS LESS THAN HALF THAT OF ANY OTHER. It will condense the whole of the Exhaust Steam from the Engine if required, and entirely does away with the NOISE and BACK PRESSURE from exhaust pipes.

ALL THE TUBES ARE OF SPECIALLY PREPARED SOLID DRAWN BRASS AND COPPER; both ends are expanded into the bored holes of the same Tube Plate, METAL TO METAL, and every tube is free to expand and contract independent of each other. Leakage is impossible, as, when the tubes are once fixed, nothing short of cutting out will remove them. No scurf adheres to the tubes because of the difference of expansion between SCURF and BRASS. The inside of the Heater can be washed out by means of the mud cock and hand hole whilst at work.

Only one pump or injector is required, and as the Heater is placed between the pump and the boiler, the water is forced, COLD, into it, and passes out at the top HOT into the boiler direct. Where the WATER WORKS PRESSURE is sufficient no pump or injector is needed.

The water being heated to BOILING POINT UNDER PRESSURE in the Heater, a saving of from 20 per cent. to 25 per cent. in fuel is effected; the disastrous results of grease in boilers are also avoided, the sewage and other loose matter in the water being deposited in the Heater, the acids are liberated there instead of in the boiler.

Every part can be lined with BRASS, COPPER, or LEAD, as may be required in special cases for heating water or any kind of liquor in large quantities for CHEMICAL WORKS, BATHS, WASH-HOUSES, AQUARIA, GREENHOUSES, BREWERIES, WOOL WASHING, DYE WORKS, TANNERIES, &c., &c.; they will also HEAT AIR FOR CUPOLAS AND BLAST FURNACES, and are now at work as INTERHEATERS for compound engines with direct steam from the boiler with a further saving of 15 per cent.

The New Price List, with detail information, is now ready, and will be sent on application, together with an Illustrated Catalogue, with references and testimonials from Firms using two HUNDRED AND THIRTY-THREE of these Heaters.

LAMBERT BROTHERS,
Alpha Tube and Fitting Works,
WALSALL.

Boiler Tubes, Hydraulic Tubes,
Sluice Valves, Hydrants,
Stop and Draw-off Cocks,
Boiler Mountings,
Safety Valves, Pumps, &c.



MANCHESTER WIRE WORK.

NEAR VICTORIA STATION, MANCHESTER.

(ESTABLISHED 1790).

JOHN STANIAR AND CO.,

Manufacturers by STEAM POWER of all kinds of Wire Web, EXTRA TREBLE STRONG for

LEAD AND COPPER MINES.

Jigger Bottoms and Cylinder Covers woven ANY WIDTH, in Iron, Steel, Brass, or Copper.

EXTRA STRONG PERFORATED ZINC AND COPPER RIDDLES AND SIEVES.

Shipping Orders Executed with the Greatest Dispatch.



Original Correspondence.

THE TRADE IN IRON AND COAL FOR THE FIRST THIRD OF 1877.

The attention of the public is at present more directed to the iron trade than to any other branch of commerce, because of the long and severe depression to which it has been subjected. We have often insisted upon the fact before it was generally recognised that British mines for metals and minerals, taken as a whole, constituted the greatest basis of our trade. It is to our coal and iron that the two most important branches of our textile manufactures owe their power—cotton and woollen—and although in a less degree the linen fabrics of Ireland, and also of Great Britain, owe their ascendancy. It would be a useless repetition of what we have often urged upon the consideration of our readers were we to recount the fact that in all branches of British trade, mines, either metalliferous or mineral, supply the great fundamental resources of our powers of production. The trade in iron, as it affects miners, manufacturers, and merchants, has for a considerable period been depressed. A very general opinion has prevailed that this has been caused by foreign competition, but this judgment is not sustained by a close examination of statistics, although of a certainty in the finer branches of iron manufacture France, Belgium, and Germany have to some extent successfully competed with us. The real reason of our falling iron exports has been that our customers have been poorer, and unable to deal with us, and as far as railway iron was concerned that they were already well supplied by British imports or their own manufacture. The present aspect of the export trade can best be seen from the Custom House Returns, and, on the whole, it is not unfavourable.

Taking our entire trade in iron in review it is seen that our imports of iron ore for the first third of 1877 was valued at 396,540*l.*, an increase of more than 150,000*l.* on the same period in previous years on an average, showing that our own manufacture of iron had increased, but rather making against the quantity of iron ore produced at home. The imports for the month maintain about the same proportions. Bar-iron was imported to a very much less degree than usual. The figures for the three years in the same period stand at 217,945*l.*, 201,896*l.*, and 159,501*l.* The import of unwrought steel this year was valued at 23,580*l.*, a little less than the third of that of last year. The import of manufactured iron was 482,064*l.*, a slight advance upon the usual imports. It is, however, to be observed that the "re-export" of iron amounted to about one-fourth of all that was received, and the export of foreign steel was nearly equal to all we received. These circumstances are rarely, indeed hardly ever, taken into consideration by the general Press when commenting upon our imports of iron and steel. The total values of iron exports for the first third of this year has been over 5,750,000*l.* against about 180,000*l.* more in the corresponding period last year, and nearly 1,200,000*l.* more than in that of 1875. It is, however, important to notice that notwithstanding lower values quantities have increased, the total of iron and steel exported having been 644,014 tons, against 604,341 tons last year, so that there is an evident improvement in the amount of business transacted, but which takes place at lower prices, the margin of profit on the part of makers not being less, because coal, wages, railway carriage, and shipping freights are all cheaper. Taking the month into review, the characteristics of total export are similar to the longer period. The value was 1,631,324*l.* against 1,709,726*l.*, and the quantities were 157,495 tons, compared with 185,882 tons.

Examining the exports in detail, we shall first take steel. Manufactures of steel, or of steel and iron combined, were valued at 212,333*l.* for the four months, slightly less than in the corresponding period last year, but the tonnage was 3,085—67,000—more than last year. The value for the month was 64,405*l.*, and the tonnage 1,062, the fall in value corresponding with that for the four months, the increase in quantity being over 100,000 tons beyond last April twelvemonths, and 67,000 over April, 1875. We shall examine other departments according to their importance. Cast or wrought and all other manufactures are computed together (except ordnance), and answer for a larger amount than any other class of iron exports. The value for the longer period is 1,097,791*l.*, about 147,000*l.* less than last year. But here, again, quantities are in favour of the present year, being 76,031 tons, against 72,357 the first third of last year, and 70,729 in the period of the year before that. The month shows a value of 313,961*l.*, which is about 50,000*l.* about the average of the four months; it is, however, 37,000*l.* less than last year. The month shows the same proportions as to quantities. Tin-plates constitute the next most important branch of the trade. The value for the last four months was 982,639*l.*, against 957,611*l.* in the corresponding period last year. The increase is due to the improved trade in April, when the computed value was 279,690*l.*, against 244,823*l.* in the corresponding month last year. The quantities also demonstrate an improved business for the first third of the two years respectively; the figures were 48,257 tons this year, against 41,752 tons last year; and during April 13,940, against 10,702 the April before, and 10,816 the April before that.

Railroad iron stands next in consequence. The value was 814,027*l.*, a slight falling off in comparison with last year, but not very much beyond half the value of the previous year. The month shows a great increase, being far above its average in the four months; the value was over 250,000*l.*, not far short of last year. When we look at quantities, there are 100,177 tons for this year against 94,424 last, and the increase for the month is more in proportion. A better price for tin-plates has obviously been obtained in the month of April. Next in range comes the classification of hoops, sheets, boiler and armour plates, including galvanised. The value for this year, so far, has been over 750,000*l.*, more than 100,000*l.* less than in the same portion of last year, and the decline on the month of April continued. But here once more quantities come to the front in favour of 1877; there were 57,524 tons exported this year, nearly 700 tons more than last year. In April there were 13,519 tons, about 123 tons more than in April, 1876. Since the present month commenced the exports of galvanised have increased. Pig-iron figures for 726,324*l.*, a falling off to the extent of 63,000*l.* from the period with which it is compared. During the month two-thirds of this decline occurred, notwithstanding that the exports for April were heavier than for any other month of this year. There was a falling off in quantities also for the month, although an increase of a few thousand tons for the third of the year. Since April closed there have been better reports of Scotch pig. Bar, angle, bolt, and rod are grouped together in the returns, and are valued at 661,291*l.*, an increase of over 20,000*l.* upon the same period last year. This was entirely gained last month, as but for an increase of 23,000*l.* there would have been a decline of 3000*l.* upon the year. Wire of iron or steel, not included in steel or mixed manufacture, answers for over 750,000*l.*, a slight increase upon last year. This increase, as in the last-named department, was entirely achieved in April. The value for that month having been 60,518*l.* In quantities there is a decided advance over the previous two years, and over the corresponding month of each year.

The United States used to relieve us of our old iron, but her import of it for April, 1875, of 6092*l.*, has dwindled to 293*l.*; nevertheless, other customers have come in, and there has been a considerable increase both in values and quantities; the value for this year was 26,757*l.*, an increase of 30 per cent.; the month maintains the same proportion in its advance.

In certain appendices to the Custom House Returns the value of iron rails is placed by conjecture at 220,497*l.*, as against 479,207*l.* for the four months, and 93,964*l.*, as against 121,341*l.* for the month of April. The value of steel rails for this year is 346,839*l.*, against 194,755*l.* last year. The quantities are proportionate. From these additions to the returns we are shown plainly that our export of iron rails is declining, and of steel rails increasing.

The course of the iron trade has been in some respects disheartening, or would be so but for the indications of increased demand by larger quantities exported. The United States is the greatest importer of tin-plates, and this trade with the Union improves in declared value and quantities, but for cast or wrought the decline is

formidable, for hoops and sheets it slightly improves, but for steel and railroad of all sorts the decline, not so much from last year, but from the usual course of custom, is signal. Australia is an excellent, and growing customer, and likely to continue so, especially for rails. India also deals largely with us in some departments, particularly cast and wrought iron, hoops, sheets, and boiler plates, and railroad iron. Much has been said of late as to the rivalry of Belgium, but it appears that during the four months we exported iron pig to that country of the value of 105,908*l.*, nearly the same as last year. To Holland we sent pig-iron to the extent of 155,249*l.*; to France, 99,113*l.*; and to Germany, 192,174*l.* This certainly does not look like a dangerous competition with us on the part of continental Europe, although at the outset we admitted that there is some competition in the finer qualities of iron manufacture. Russia, Spain, Sweden, and Norway have dealt with us to a large extent for rails. In this respect Russia was our best customer, taking 118,383*l.* British North America bought bar-iron to the extent of 62,000*l.*

As coal is usually noticed in articles on the iron trade, we may state that the value of our exports this year has been 2,236,496*l.*, a falling off of a quarter of a million from last year, and nearly as much from the year before. The trade greatly increased last month, but fell somewhat short of April, 1876. But an examination of quantities shows an increasing and prosperous demand for the mineral by foreign nations. France is by far our largest customer, taking one-fifth of the whole, Germany a-tenth, Spain, Italy, Sweden, and India are all large customers.

We cannot resist the impression, notwithstanding the despondency expressed in many quarters, that there is a good feature for the export trades in coal and iron.

COMPRESSED AIR—LIABILITY OF MANAGERS.

SIR,—I notice in last week's Journal that Mr. Colwell is descending on the advantages of compressed air. It is only fair to say that many of the advocates of the present system have been astonished at the length of time that five men lived in the Welsh mine. So far as I can make out they were confined in a space of 15 cubic yards, and yet they do not seem to have suffered from defective air. I should like much if any scientific man could explain this.

It would be difficult in main roads to work with compressed air, but in tunnel driving, and some descriptions of sinking, it might readily be done if there was any advantage to be gained. By the way, I notice that the manager of the Welsh colliery has been committed for manslaughter. Now, if this verdict is sustained in a criminal court to a certainty the relatives of the deceased have a good case against him for compensation; and, if they choose to sue him, and he has anything to lose, they will take it from him. Now, this is a hard thing, and a manager is not paid for such risks. I hold that the owners should in such a case pay the damages, not on sufferance, but as a matter of right.

PREVENTION OF EXPLOSIONS IN COAL MINES.

SIR,—I listened to the reading of Mr. Stevenson's paper on an Improved Method of Detecting Small Quantities of Gas, at the Northern Institute of Mining and Mechanical Engineers, with the greatest attention and interest. It is, of course, so long as shot firing is allowed where safety lamps are in use, of the greatest possible importance that the officer intrusted with the duty of examining the place when a shot is to be fired should have the best means that can be devised of detecting either large or small quantities of explosive gas.

In the paper of Mr. Stevenson it is stated that as coloured glass absorbs light or flame, a small slip of blue opal glass placed before the flame of a Davy lamp enables "the observer to detect the presence of gas when quite invisible to the unassisted eye; the yellow flame having a clear white appearance, and the blue cap a much more distinct and striking effect. Now I have, with other practical miners, carefully tried the experiment so far as we can understand it here, that is with a piece of fine blue opal glass, and the result is that the flame shows a blue colour exactly similar to the colour of the gas, and the result is a decided disadvantage, as we can discern the gas sooner with a pricker in the ordinary way than by using the glass alluded to. It is quite possible that we have got glass of a shade or make not suitable for the purpose, and we will be very glad if any correspondent of the Journal will enlighten us on this subject.

A VIEWER.

THE USE OF THE BAROMETER IN CONNECTION WITH THE WORKING OF COAL MINES.

SIR,—There is no doubt whatever that the barometer is a very useful—but it would be a mistake to consider it a perfect—instrument, it is certainly capable of improvement; there are also various kinds or forms of barometer, and it is, perhaps, worth looking a little into this part of the question. An ordinary upright mercurial barometer commonly in use at mines is steady and reliable, but its movement is slow and so small that the gas has no doubt moved before the movement of the barometer has attracted much attention. A large aneroid barometer is more sensitive, and has a larger range than the one named above, and it is an advantage to have one, but there is little doubt that we require a portable barometer of improved make, sensitive, and having as long range as possible. It has been stated lately that Mr. Renier, of Paris, barometer maker to the French Academy, has invented a barometer suitable for miners, perhaps some of your correspondents can describe the improved instrument.

A. R.

CAKEMORE COLLIERY COMPANY.

SIR,—I observe a short paragraph in last week's Journal which, although literally correct, might without some explanation give rise to a misunderstanding on the part of the shareholders and others who have been led to expect that the make of bricks at this colliery would considerably exceed the 60,000 a week mentioned by you. The reason why the make does not at present exceed that quantity is that the directors considered it absurd to purchase and draw at a cost of about 30*s.* per 1000 the bricks required for building the additional kilns when by utilising those already erected they could be made on the property at about 12*s.* 6*d.* per thousand; the result is that until these new kilns are completed (which will be within a week or two) the kiln power is not up to the capacity of the brickmaking machines and drying floors, which are capable of turning out fully 180,000 bricks a week. I may also add that Mr. Clayton, sen. (of Messrs. Clayton, Son, and Howlett, the celebrated brick machine makers), was at the colliery a few days since, and pronounced the bricks as of first-rate quality, which is confirmed by the ready demand for them in the neighbourhood, orders being already in advance of the make.

Finsbury-circus, May 24.

A. W. SNELLING, Secretary.

AIR COMPRESSORS AND ROCK DRILLS.

SIR,—Since the notice on Air Compressors and Rock Drills, in the Supplement to the *Mining Journal* of April 21, I have received a copy of Capt. Drake's report to the directors of the Eberhardt and Aurora Mining Company, from which is taken the following extract—"The air compressing machinery and rock drills ordered of Mr. J. G. Cranston, Newcastle-on-Tyne, while I was in London, were perplexingly long in transit, not arriving upon the ground till Oct. 2. The erection of the machinery occupied some two weeks, and the drills not fairly running before Oct. 20. After a little practice by the men in working the drills a good degree of progress was attained. The general character of the ground through which we have passed is firm hard lime rock, but it generally blasts well, and only a set of timbers is required. The tunnel machinery is working quite satisfactorily, but I fear that possibly the air compressing engine will not prove of sufficient capacity for driving the tunnel to completion. The three drills are doing good work, but as our rock is so hard the strain and wear upon them is of necessity very great. There will be need of adding to their number, either of the same kind or some other good drill."

Previous to ordering the machinery alluded to in this report Capt.

Drake had carefully examined several of the most prominent rock drill machinery in this and other countries, and finally selected the above-mentioned machines as best applicable for his purpose. In a letter to Mr. A. Critchett, dated April 24 last, Capt. Drake, on his return from a tour to the various mining companies, particularly with reference to the tunnel works in the Comstock Mines in California, reports—"After having visited and carefully inspected the workings of the principal patterns of drills used we are pleased to believe there is no better drill than the Cranston, which is doing most excellent service," and requests that more of the same machines should be sent out. [These are now being sent.]

Some contributors to the Journal, when writing upon the relative merits of drill mining machinery, more particularly with regard to cost per foot, seem to disregard or are unaware of the vast difference in the price of fuel and stores and labour, the latter being as 3*s.* 9*d.* is to 16*s.* paid by the Eberhardt and Aurora Company in Nevada, also the nature of the rock and mineral substance being driven into; upon which matter Capt. Drake adds, in the same letter—"The tunnel is exceedingly strong hard blasting rock—it can hardly be possible to find worse, but the usual headway is still made, 36 ft. per week." One machine has recently accomplished in a four months' run over 7000 ft. of shot-holes without any cost whatever for renewals or repairs, and are regularly drilling the blast-holes in limestone rock, which previously cost from 9*d.* to 1*s.* per foot to drill by hand, at a cost less than 2*d.* per foot, including cost of fuel, labour at boiler and machine, fettling drill-bits, and repairs to borer. These machines are employed in various mines for drilling blast-holes in many different positions where it would be quite impracticable for the miner to drill them in by hand. Holes several feet long are frequently drilled by the machines vertically into the roofs; by this means large quantities of mineral are quickly and economically quarried down by a single shot-hole. A number of these machines can be seen in practical operation, regularly doing the work at a cost less than one-fourth that of hand-labour.

Grey street, Newcastle-on-Tyne, May 23. J. G. CRANSTON.

ROCK DRILLS.

SIR,—Whatever may be the custom in other counties, in North Yorkshire the miner's shift is six hours, not eight. We have, therefore, four shifts in the 24 hours instead of three. It is not the usual practice with us to work continuously through the 24 hours, although for special reasons we do so occasionally. The reason is that we find by experience that eight men in four shifts will not do twice as much work as four men in two shifts, neither will they do it at the same price. Your correspondent "M. E.'s" statement that three shifts of men working eight hours will cut three times as much ground and for the same price as one shift working eight hours and choosing their own time is contrary to all mining experience.

Let anyone foolish enough to believe in such a theory come and try it in a mountainous district like this, when the snow is 2 or 3 ft. thick on the hills, the thermometer 10° or 12° below freezing, all the water-courses frozen up, and the miners "trods" blocked up, and he would find his night-shift men all fast asleep in their beds, and quite right too. But I must decline further correspondence with anonymous writers. I hoped to get a few wrinkles from the readers and writers in the *Mining Journal*, but must confess to having been most grievously disappointed.

May 23.

GEO. WM. DENYS.

NEWTON SAINT CYRES, DEVONSHIRE.

SIR,—Just a line to inform you that our parish is showing signs of improvement. First, a very comfortable and commodious school-room has lately been erected. Secondly, great credit is due to the Messrs. Sims for their spirited trial of the manganese mine. Here the ore is found in the red sandstone. It is very rich, and likely to be produced in large quantities under the deep adit. Thirdly, I wish to call the attention of capitalists to our valuable lead mine, situated in dark kellas, because, judging from old reports, and from the fine specimens which have lately been raised from an old shaft, a small outlay would be the means of bringing a good deposit to light. Both the mines are not far from Exeter, and near a railway station. I am informed that about 30 years ago this parish was full of industrious miners, which made it a very lively village.

May 23.

E. T. MAY.

Vicar of Newton Saint Cyres, Devonshire.

A CALEDONIAN RAMBLE.

"Caledonia, bleak and wild,
Fit nurse for a poetic child."—SCOTT.

SIR,—Last summer I had the honour to write you a lengthy article entitled "The Land of Burns;" I have again, I hope, the pleasure of placing before your readers a second sketch entitled "A Caledonian Ramble." Of all places that I have ever visited where the romantic could be calculated to inspire the soul, the territorial regions of bonny Scotland usurp the sway. I have travelled beyond the Canadian shores, and have listed to the mighty waters of the rolling Niagara; I have seen the redskin Indian in his wigwag in the Far West; I have sunned myself in gondolas beneath Italian skies—but Caledonia for beauty, for picture-queeness, for grandeur and delight for me, for me. It is here where the kingly eagle builds his nest, and with majestic defiance beholds the monarch of the skies mounting in imperial splendour his gorgeous throne; it is here where the wintry blast sweeps across the mountain peaks, and where the great hero lay along the rocks, and recalling his wish to be in sunnier lands than his, blessed God he dwelt within the golden regions of luxury and liberty. It was here that Scott delighted the world with his luxurious writings, and Burns lay dreaming of Mary in Heaven.

But whilst I am depicting in somewhat poetic imagery this delightful country, I must not forget that I have a more matter-of-fact mission to accomplish in connection with your well-known paper, for which Journal this letter is expressly written, I must not cease to remember that it is to the recognised organ for mining speculations that I am writing, and that I need be both particular and concise in all I say.

Travelling through Elgin and approaching Lossiemouth—that lately discovered centre of the most valuable lead ore in Scotland—I came across a property about half-a-mile from the village and shipping port of Lossiemouth, where I found great facilities for loading and discharging are offered, and which adjoins the Great North of Scotland Railway Station. Having a hearty liking for all metalliferous operations, I was naturally struck with the sight of such value in what I at first thought so un-known a spot, but on walking along the Moray Firth I actually beheld ore in one continuous run cropping up even above the surface to the extent of half-a-mile, but on making careful enquiries I found the district was not so obsolete as I had anticipated, a private party of Liverpool gentlemen having, according to the manager's assurance, opened up extensive operations, and a shaft of 60 ft. was already sunk, the mine being known in that locality as the STOTFIELD MINE, near Lossiemouth, and receiving its name from an adjacent village. Making a friend of Capt. John Lobb, the manager, whom I found most willing to enlighten me on every subject, I am enabled after much research to place the following particulars before the readers of the *Mining Journal*.

In walking on the course of the lode anyone can see its richness, for several costeaning pits have been made for a distance of half-a-mile. There is a substantial engine with a 9-in. lift of pumps, which were cast by Messrs. Walker and Pendleton, of Liverpool, expressly for the mine, and which work admirably, all uniting to show that the lessees contemplate sparing no expense to give the undertaking the most marked issue.

Referring to the lode again, it being, of course, that part of the whole on which success depends, I can confidently say that wherever it has been cut it has been found to be of the very richest quality, and piles of it may be seen in a large shed near the shaft, which have simply been accumulated through the proprietors testing their undertaking. I, for my part, wish these gentlemen much success. It is a source of great pleasure to me to behold the speculative industry of the British Isles, and to recommend any laudable speculation to

your read-ers. With this purport in view, I have expressly addressed this epistle to your excellent Journal, and were it not that I am fearful of trespassing too greatly on your valuable space I would have added some further particulars, but reserving the more vital properties of the Stotfield Mine to a future letter.

C. ELLIS.

AN APPEAL TO MY COUSINS IN TOWN.

SIR.—At the annual meetings which are approaching of the Roman Gravel and Tankerville Mines I hope that some of our relations in town will cause a strict enquiry to be made into the management and accounts of both.

The Roman Gravel owed us four months' dividend, and by the Burry Port Smelting Company lost (the directors said so themselves) only one month's profits or returns—why have they not paid us the other three months? Especially as they assert, with apparent truth, there has been no falling off in the mine. However, they have not done so, but have taken a course which was sure to send down the shares. They postponed the dividend two months longer without assigning any other reason than the loss by Burry Port.

The last annual report of the Tankerville Mine was most glowing. One director travelled 400 miles rather than lose so delightful a meeting. The mine was quite under control—never looked so well; the machinery first rate; the captain full of modesty, but covered with blushes and congratulations. He did not like to promise too much—he could not see through the ground; but 150 tons a month as before, certainly. He fully expected much more. Even the old workings were going to pay. There was (all agreed) a bright future for Tankerville.

True, the accounts looked shaky. The reserve was drawn on, unless memory deceives me. And, behold! suddenly—no dividend. The produce of the mine stated to be reduced one whole third. Everything the reverse of what the meeting had promised, and no hope of speedy improvement. No wonder the property in the Tankerville Mine is most seriously, and perhaps permanently, reduced in value.

So far as I can see or understand, the directors of these mines have taken the surest course to diminish the property of their shareholders. I shall be thankful to anyone who can set me right, if now wrong, for I am only—

May 22.

A COUNTRY COUSIN.

PARYS MOUNTAIN, ANGLESEA.

SIR.—I have read with some considerable interest the letters of your correspondents in last week's Journal concerning this mine. Your correspondent, "Mine Investor," however is in error in calling a certain portion of the mine The Maria Mine. I presume he means, without doubt, The Mona Mine. I find another rich branch has been cut in the 90 cross-cut, which looks well for coming wealth of no ordinary sort. Of course any hour may now make up for loss of interest on capital, judging from the favourable reports issued risk is now reduced to a minimum. A great demand having arisen for shares in Parys Mountain since the last meeting the price has steadily advanced, a scarcity in supply having tended to stiffen the market, present holders being now unwilling to part with their valuable property. I note that Messrs. Watson Brothers, of 1, St. Michael's-alley, Cornhill, state their belief that an enormous rise in the price of these shares must take place when the intermediate lode (close at hand) in the 90 cross-cut is struck, and that they will approximate to par value on the assurance of the determination of the proprietors to raise more capital, by simply subscribing for shares in the valuable Morfadu property, a splendid investment, with immediate prospects of large dividends. A fact we may state already accomplished by resolutions and support given at the last meeting.

OCCASIONAL CORRESPONDENT.

PARYS MOUNTAIN.

SIR.—I am glad to see in last week's Journal that great expectations are formed of the ultimate success of this interesting property, and that it is now fully believed to be about to return to a position second to none in Wales. I should be glad to know when the next meeting takes place; or to obtain all information from some of your able correspondents as to the likelihood of the property again becoming so rich as spoken of in the various articles. It appears to me that a very small sum of money would drive the 90 cross-cut into the mass of ore expected, most sanguine hopes being entertained of success. The reports of Capt. Mitchell are now watched for with increasing interest, and any hour a telegram may bring the welcome news so anxiously expected. It would, therefore, appear that this mass of ore (from which flows the tale-telling stream of thick copper) may be won without the aid of more capital, at least we may reasonably believe that a good chance exists.

CORRESPONDENT.

CARDIGANSHIRE MINES, A.D. 1877—No. XVI.

SIR.—I promised in my last to commence my remarks on the old Ystmythyen Mine, which is situated immediately to the west of the Aberystwith Mines, the same lodes running through both properties. Although this mine has been worked for centuries, and during the present one has returned vast quantities of lead ore, and being the only mine, with the exception of Cwmystwith, that smelted its ore in this county, at a place known as the "Smelting," and standing opposite to it, about ½ mile west of the Devil's Bridge, the ore having been smelted with peat, which abounds in that neighbourhood, and of an excellent quality, the deepest workings have only reached a point of about 80 fms. above sea level, so that what may really be termed mining has not yet commenced, but may more accurately and appropriately be termed shallow adits and surface working. It is supplied with the most perfect dressing machinery yet erected in the Principality, and the only thing required is to extend a cross-cut north throughout the grant, to intersect the lodes standing whole in that direction, and to deepen the workings, to make this a lasting and very profitable mine.

I shall next offer a few remarks on the Tynyfron Mine, to the west of old Ystmythyen, and also having the same lodes running through it. It has lately been registered with a capital of 10,000l., and more than ample working capital provided for the erection of all the necessary machinery and the proper development of the workings. Like the former property of which I have been treating, it has only been worked by shallow adit levels driven in from the side of the hill, about 80 fms. above the bed of the Rheidol. So far as the lode has been worked, it is one of the richest and most compact of any that have been opened on the great Ystmythyen vein, which has been worked at surface for many miles in length. The piles of ore now lying at surface awaiting the erection of the machinery (which will be driven by the River Rheidol, a water-course from it passing through the grant) is the finest pile of ore I have seen for some years, and to anyone who may wish for information or inspection, as wishing to put capital into a bona fide property, I should advise them to come and see it for themselves. There is a very large quantity of ore ground laid open above the adit, as well as a shaft sunk under it for 12 fms., the deepest point being the richest. Like old Ystmythyen, a cross-cut should be extended north to cut all the lodes standing in that direction, and the mine deepened at the rate of 15 fms. annually. If this is adopted I shall not be surprised to find each 1l. share in less than two years selling at from 10l. to 15l. per share, and I fully believe that Tynyfron is destined to become one of the greatest mines ever yet worked in Cardiganshire.

Now, as we see that mining in this county is really beginning to make a start, let me offer a few general remarks as to their position and the probabilities of their success. I will first take the Cambrian Mining Company (Limited), which has been registered with a capital of 100,000l., out of which, after paying the purchase-money, there is ample, and I may safely say more than twice the amount of working capital provided than is really necessary, or that will ever be required. These mines have already produced millions of pounds worth of silver-lead and other rich ores. The very deepest point yet seen in them is 100 fms. above sea level, whilst the adit I have recommended to be driven would pass through the grant and under these old workings 40 fms. deeper than the deepest point yet seen. This adit would have to be driven on the north lode, and when it

reached a point 250 fms. eastward from its mouth a cross-cut south 50 fms. would reach the great Esgair-hir lode, in entirely virgin ground, and I do not hesitate to predict that at this point a richer course of ore will be found deposited than has ever yet been worked on this magnificent vein, and that a property will be opened out that must continue immensely profitable for a century to come.

Next, a capital is to be raised for Cwm Erfin, which has just reached the sea level, and which has produced silver-lead ore to the extent of 700,000l. It is surrounded by mines that have been worked 80 fms. deeper, and have produced millions sterling, and what has been done here can only be accounted as surface scratchings. Short cross-cuts to lodes untried in the grant, and the deepening of the mine, must lead to a great success; it is an impossibility, humanly speaking, that it can be otherwise. In looking into matters, and going into calculations as to what was (say) 20 years ago, and what is now, I find that had the last company erected a stone-breaker, and applied Mr. Green's self-acting dressing apparatus, a saving of some 8000l. would have been effected in cleansing the ore, whilst a saving of 10 per cent. of the ore washed away, which is within the mark, would have added to the profits divided above 17,000l. more, so that these two items alone would have added 25,000l. to the dividends. Of this and other matters, more as I proceed.

Goginm, Aberystwith, May 22.

ABSALOM FRANCIS.

MAP OF CARDIGANSHIRE.

SIR.—It seems strange, and is a great pity, one cannot get a good reliable Map of the Cardiganshire Lead Mining District, on a scale of (say) five chains to an inch. Such a one, though small, would, if well constructed, be very useful. Capt. Francis has written a book about the mines, but this is very little use without a map in similar terms. He says he has surveyed nearly all those mines; surely it would be well worth his while to publish such a map as I speak of.

May 23.

WALLER.

CORNISH MINING.

SIR.—In endeavouring to point out to the enterprising public mines which I consider to be as free from risk as such properties can possibly be, such opinions being based on practical experience and observation, due regard is also given to the judgment of parties under whose supervision the operations are carried on. There are many mines known to the writer, from want of proper management, which have been abandoned as being unproductive ground, taken up again, reworked under the supervision of persons better qualified to carry out such operations, and attended with great success. Wheel Comfort is a case in point, where at the adit level a cross-cut was driven on the cross-course, carrying only a part of it, the consequence being that the discovery recently made was missed by the former workers, to the advantage of the present proprietors. I am pleased to say this discovery is likely to lead to results equalled only by its rich neighbours, Tresavean and others, in the well-known Gwennap district. Some two months since the shares might have been purchased for a few shillings per share, while they are now sought after at 50 many pounds. This is the pioneer mine to several in a similar position, selling now for less than one-half the value of machinery on such mines. The present is, therefore, most assuredly a good time for the investor to make the necessary enquiries into the real state and prospects of the different mines, so as to make a selection as shall tend to his benefit, the risk being insignificant compared to the probabilities of success attending such small outlay.

St. Day, Cornwall, May 23.

CHARLES BAWDEN.

CAPT. TREGAY, AND PEDN-AN-DREA MINE.

SIR.—"Argus" maintains his predilection for fiction. He says—"W. X." starts off as though the balance-sheet from 1875 had left a clean book, but this is far from the reality. The company's balance-sheets, in the printed and published circular to the shareholders from 1875, show liabilities a "total of 8490l. 16s. 1d.," and he adds "so that clearly, on a call being then made of 7015l. 19s. 7d., a clean balance of 1475l. 10s. would be left against the company, instead of 1091l. 6s. 7d. in its favour." Here is the *suggestio falsi* and the *supplicatio veri* with a vengeance. "From 1875" would naturally mean from the end of that year, but it should be from only May 14, 1875. Then, again, "Argus" gives the gross liabilities at that date, and forgets the other side of the account. He and his client (Tregay) may labour to show that the accounts of the company were wrong, but all that I have to do with is that the official balance sheet, issued in June, 1875, states in exact figures the *debit balance* to be 5924l. 13s., and the call then made amounted (as by the subsequent balance-sheet) to 7015l. 19s. 7d., leaving a credit balance of 1091l. 6s. 7d. to start with from May, 1875. The total debit balances in working the mine from May, 1875, to Aug. 4, 1876, after allowing all calls as good, amounted by the official accounts to 16,395l. 15s. 4d., and the calls made in the same period to 15,800l. If "Argus" intends to allege that the company issued fictitious accounts let him say so clearly, and at the same time explain why nearly 16,000l. was called for from the pockets of the shareholders in the last fourteen months of the late company.

"Argus," as usual, does what he can to distract attention from the real point. He now says that of the 100,000l. lost by the late company 34,741l. was gone before Capt. Tregay entered their service. Here he stops short, and thinks he has given a complete and triumphant reply to my enquiry. But why does he not go on to answer the question so often asked, and explain how it is that the remaining 65,000l. was lost under Capt. Tregay's management for the late company, with a much higher price for tin, when in a few months' working the mine for himself, and with considerably lower prices for the returns, he is able to make good profits? (if this be true, as reported). No matter whether the loss made by Capt. Tregay was 100,000l. or 65,000l.; the latter sum is quite large enough to make an explanation important, and we have the advantage of at last an admission to that extent. Of course, if Capt. Tregay is not making profits by the working of the mine it is very easy to say so, and the answer would be conclusive. Why beat about the bush on the subject? In a former letter I showed that the average monthly quantity of tin sold in the last year of the late company was about 20 tons, and the average monthly cost for same time was 1850l., though Capt. Tregay had reported considerable reduction in the expenditure. I also pointed out that the sale of tin for March this year, as officially reported in your Journal, was 40 tons 16 cwt., for 1741l. 5s. 3d., so that it was difficult to see a profit, even if it cost the same to return the larger quantity as the smaller, unless, indeed, they are what is called "picking the eyes out." When I am told by Capt. Tregay's advocates that I refrain from making any statements as much as possible, it shows how much they disregard facts even when repeatedly stated.

With respect to the mare's nest of a balance-sheet in February, 1876, Mr. Sharp pointed out that at the meeting that month the then secretary, the books, and the accounts were all absent, and that another meeting was ordered to be held the following month. In March a balance-sheet was presented, which included a complete account from May, 1875, to February, 1876, showing a debit balance of 11,002l. 17s. Does "Argus" mean to say that this loss was made in one month?—May 21.

W. X.

CAPTAIN TREGAY, AND HIS ACCUSERS.

SIR.—I have glanced over all the letters which have emanated from Mr. Granville Sharp, "W. X.," and others through the Journal with reference to Pedn-an-drea Consols, which show a wicked animus. Those writers wish to make it appear (but they cannot) that Capt. Tregay acted dishonourably towards the late company by concealing the actual state of the mine. Is it not true that Capt. Tregay entreated the late company not to let the mine get into other hands, and that they would not take his advice? If he wished to take an undue advantage over them it is to be supposed that he would have urged them to retain their interest in the mine? He bought the mine and machinery at a price beyond the offer of anyone else, if, indeed, any other offer was made; and I admit he had a good bargain, and I am glad for it, but the opportunity to buy was open to other people. It was not a hole-and-corner transaction. I am told that not a single member of the late company complain in

the matter; they appear satisfied with what was done, although rich discoveries have been made since the property came into Capt. Tregay's hands, a circumstance upon which I congratulate him. I would say to these busybodies in other men's matters "Study to be quiet, and to mind your own business."

Hotel, Redruth, May 23.

Toucan.

MINING IN GWENNAP—WEST TRESAVEAN MINE.

SIR.—Those persons who think that the mineral resources of Gwennap are exhausted are invited to pay a visit to West Tresavean, which is situated in proximity to the celebrated Tresavean Mine, of famous memory. I was at this mine on Tuesday, when I met several gentlemen who came there to see the tinstone raised from a lode stone, a large heap of which is lying near the whim-shaft called the Mitchell's shaft, was taken from that lode at the adit level, which is 5 or 6 ft., and the whole of its contents is fit for the stamping mill. The percentage of tin in the stone is unusually high, so that the discovery is a rare one, and likely to yield considerable profit to the company after the reduction appliances shall have been in operation a reasonable time. The quantity of tinstone is said to be practically inexhaustible; the reserves extending from the adit to the surface (40 fms.), and to an unknown depth, from the eastern William's lode a few fathoms south, are embedded in a great clay stanniferous yield in ancient times. In front of Mr. A. Pryor's dwelling house at Bell Veor is a very wide excavation made by the ancients on that dyke for the extraction of the tin it contained. It has also been operated on in old Penstruthal sett; but the works in West Tresavean will be confined to the lodes, which are numerous. There is Penstruthal main lode, which yielded in that mine 60,000l. profit in one year. This is a copper lode, and of course will receive the company's early attention; but just now a quick return of tin in large quantities will give early dividends if the works are prosecuted with that vigour which is warranted by the character of the lodes, and especially that of Parkyn's lode. I would advise all possible expedition in the metallurgical preparations, and as immense quantities of tin will have to be conveyed to the stamps, I submit to the manager whether it would not be well to lay down a tramway from Mitchell's shaft to the stamps. The steam-engine for the stamps being *in situ*, a short time only is requisite for the completion of the appendages requisite for returning the tin. Although the price of tin is low the company can make up for that in quantity.

The other lodes—south lode, Gobban's lode, &c.—are well defined (some of them) by the deep workings by the old men, who have left the moderns to pursue them in depth. By their workings they just say—"Here are the lodes, try for yourselves." The rich discovery said to have been made in Comfort Mine, which I have not seen, is very important for the district, as it, and the discovery in West Tresavean, may lead to a re-opening of some mines in the locality, which deserve further development, and of others in the vast area of undeveloped ground in the immediate neighbourhood. The next course of Comfort lode, on which the rich discovery has been made, I know not, but I am told that it runs into West Tresavean.

Truro, May 24.

R. SYMONS, C. and M.E.

LANNER VALLEY.

SIR.—In my letter inserted in the Journal last Saturday week I omitted several items of information relative to the Valley of Lanner, *alias* Lannarth, in Gwennap. When the mines in Gwennap were in full operation—say, 30 years ago—there lived in and on the sides of Lanner village no less than 27 mine agents; at the present time there are not, perhaps, half a dozen. Many of the old agents are resting in Gwennap churchyard; some are gone abroad; very few, if any, remain in the county; and all the mines conducted by them are as silent as the grave. Capt. Wm. Martin, late of Barncoose, in Stuthians (now the property of Mr. J. M. Williams), was at that time a man of great note—an authority in mining affairs. He was considered a good miner—but he was made so by the Tresavean Mine's success. But for that success he would have remained in the ranks of ordinary agents. "A good bal makes a good capn," Capt. Martin was the manager, under Capt. T. Teague, of Tresavean Mine, and of, I believe, some others; and he was a great reporter on mines, in request, like the late Capt. Charles Thomas, for reporting. I remember a narrow escape from death which he and a miner had in a shaft, either in Bell Mine (now West Tresavean) or in Comfort Mine. They went down over a ladder in a shaft which contained a few fathoms of water. The ladder stays gave way under their weight, and fell to the bottom through the water, taking them with it. They rose to the surface of the water quickly, the one who came first to the surface taking hold of the other when he came up, almost breathless. The Captain was a notorious tippler, a habit which frequently brought him into danger and extravagance, and of course into disgrace. But late in life, his means having failed off, he became more steady. When his last illness came he said, "Now I know I shall die;" and so he did. He was, I think, about 80 years old. All the other agents are also dead. What sumptuous dinners they used to have there! At Penstruthal, which was managed by Capt. Wm. Mitchell, they also fared in like manner. A ludicrous anecdote may be mentioned in relation to two of the Penstruthal agents in the first working (1830). Capt. A. and B., as I will call them, were too intimate with the account-house girl, a rosy-faced creature; but of course one agent was not aware of the other's proceedings. When Capt. B. found that issue would soon result he agreed to marry the girl, but before he could go to church the increase appeared. He must needs, therefore, wait the convalescence of the mother. When that time arrived, A. having learned that B. was going to marry her, wrote him the following note: "My dear Sir,—Don't marry Jane, for everybody says that the child is exactly like me!" Capt. B.'s eyes were opened, and he did not marry her. The girl thereupon went to Falmouth, and, seated upon a tidal rock, was waiting the coming tide to wash her off; but someone rescued her from suicide.

There are several nice residences on the valley's sides. Capt. Olgers, near Lanner village, has a neat place there, consisting of a good house, gardens, and numerous inclosures of good land. The late residence of Mr. W. H. Treggion, the rich tin smelter, tippler, &c., deceased, is now occupied by Mr. Wicket, the managing clerk in Barncoose copper offices. Penponds, near Trevarth village, is, I believe, occupied by a Mr. Joss, a retired gentleman. Treviskey, Penventon, and some other houses are decent residences. Barncoose, late the residence of Mr. J. Williams, is now the property of Mr. J. M. Williams; this is south of the valley. At Lanner village is the villa residence of Mr. Treivolla, a respectable retired Falmouth merchant, living in great comfort, amusing himself by gardening, &c. He is the owner of the Royal Hotel and other property at Falmouth and elsewhere. Trevice House (Mr. E. B. Beauchamp) I mentioned in my last, also Trevarth House and school.

When I visited Lanner in my tour 40 years ago there were numerous water stamping mills and stamp plots, the sites of which are now occupied by houses and gardens in that village. It is alleged that the discovery of copper ore at Comfort Mine is not a myth, but something really valuable, and likely to be lasting. I hear also that the tin lode at West Tresavean is one of the best discoveries of tin ever made in Gwennap district within living memory. The agents are in high spirits about it; Comfort and West Tresavean are contiguous mines. It is a remarkable coincidence that the discoveries at the two mines were nearly coincident as to time. It is not improbable that these discoveries will lead to a revival of mining in the district; if so, Mr. Peter, of Redruth (the owner of the Comfort and Tresavean Mines), and Capt. T. Parkyn, of Roche (the manager of West Tresavean) will deserve testimonials of intrinsic value. Capt. Curtis, the mineral agent of Mr. J. J. Rogers, visited the mines yesterday, and is greatly pleased with their state. Mr. J. M. Williams also visited the West Tresavean Mine last week; from which it is to be inferred that the mines are attracting the notice of non-shareholders. As I am making a tour through all the Cornish mining districts I purpose to send you some scraps of information

100 tons to England; the average between 80 and 85 per cent. of pure phosphate. The company employed between 25 and 30 men at mining during 1876, and will have 100 at work the present season. The researches of Mr. Vennor, of the Geological Survey, show that a great trough of crystalline limestone exists between the Lievre and Gatineau rivers, towards the centre of which the apatite will not probably be found as abundantly as along each of its sides. The shipments of phosphates were—From Montreal, in 1874, 916 tons; in 1875, 1041 tons; in 1876, 2405 tons. From Quebec—In 1873, 195 tons; in 1874, 224 tons; in 1875, nil; in 1876, 73 tons. Apatite, yielding 80 per cent. pure phosphate, sells in England at present for \$28.38 per ton, and the total cost, up to the moment of delivery there, is about \$15.90, leaving a profit of about \$12.48 per ton. The manufacture of soluble superphosphate from Canadian apatite has been steadily continued by Mr. Alexander Cowan at the Brockville Chemical and Superphosphate Works, but the enterprise has not yet begun to receive the encouragement which it deserves from the farmers of the Dominion. One of the principal markets has hitherto been found in Nova Scotia. Now that breadstuffs are likely to command a high price it is to be hoped that this valuable manure for wheat lands will be better appreciated in the province of Ontario.

During the year a PYRITES mine has been opened at St. Jerome, in Quebec, chiefly through the enterprise of the Rev. Father Labelle. In addition to the sulphide of iron, the ore contains traces of cobalt, nickel, and silver. A workable deposit of iron pyrites, if found in the Lake Superior region, would be of more value than one in the eastern part of the Dominion, since it would be available for the manufacture of sulphuric acid in the Western States, where both coal and salt are cheap. These three substances are at the basis of various chemical manufactures, the products of which command high prices in the West. Mr. Cowan has continued to work his pyrites quarry near Brockville, and is producing large quantities of sulphuric, nitric, and hydrochloric acids.

Operations for SLATE have been prosecuted with vigour, under Mr. John Stewart, at the Rankin Hill Quarry, four miles east of Acton Vale, in Quebec. An average of 50 or 60 men have been employed during the year, principally in opening and developing the quarry, but a quantity of slate has also been prepared for market. The quarry contains both red and green slates, which are used principally for ornamental purposes. The colours, which are bright, do not appear to be liable to fade like those of the imported varieties, and the quality of the slates is otherwise good. They obtained a medal at the Centennial Exhibition. The production of the New Rockland Quarry, in the township of Melbourne, in 1876 was only about 4000 squares, against 7200 in 1875. The number of men employed varied between 12 and 61, and averaged about 40 for the year. The internal dimensions of the quarry are now 350 ft. in length by 130 ft. in width, and from 90 to 120 (in different parts) in depth. In an article on Canadian roofing slates written in 1863, Mr. Bell pointed out the prospect of obtaining a market in Europe for the excellent slates of the Melbourne band, and now the New Rockland Company have entered into a contract to furnish in England at a good price all they can make during the present year. They propose to employ about 100 men, and expect to produce between 10,000 and 15,000 squares within a year.

Although occurring largely in Frontenac, Lanark, and Argenteuil, PLUMBAGO has only been mined in Ottawa county. The steam mill being erected by the Buckingham Mining Company is situated 6 miles west of the village of the same name. The 16-stamp mill of the old Canada Plumbago Company was burnt in 1875, during which year and 1874 it had been employed in working up the ore on hand, principally into stove-polish. The Dominion of Canada Plumbago Company have had a 20-stamp mill at work preparing various forms of plumbago for market. On the property belonging to this company the mineral occurs in the form of veins, on which several shafts have been sunk, and in the form of a bed of a less pure variety. The company were shipping a carload a week in January, and the splendid display of crude and manufactured plumbago, crucibles, &c., made by this company at the Centennial Exhibition was universally admitted. MICA, which is valuable for making stove windows, mica powders, &c., occurs almost invariably along with the phosphate of lime in North Burgess and elsewhere, a large mass of it having been discovered in Chesterfield Inlet, on the west side of Hudson's Bay, in the central part of the Dominion.

The refractory properties of ASBESTOS, which were well known to the ancients, render it available for a variety of modern purposes. As long as it was believed to be too scarce to be of much economic importance it was but little used outside of the chemist's laboratory, and a very small quantity supplied the market. Now, however, that it has been found so useful for steam packing, fire-proof roofing, &c., a considerable demand has been created. It is found in greater or less abundance in various parts of Europe, the finest coming from Italy. The United States are principally supplied from Staten Island and Maryland, but it is found also in Virginia, New York, and other States. Its value ranges, according to quality, from \$10 to \$60, delivered. In Canada asbestos is either known or reported to occur in various localities. In some of these the mineral is true asbestos, while in others it is either chrysotile or picrosile, fibrous varieties of serpentine, which answer the same purpose. The constantly increasing use of BARYTES for the fraudulent adulteration of white lead is giving it a value which it did not formerly possess in this country. The manufactory of Messrs. Thos. Ramsay and Co., of Montreal, consumed all that was produced in Ontario and Quebec in 1876. The barytes required in 1876 by the Dolphin Manufacturing Company, of Nova Scotia, for making paints had to be imported, although in former years they obtained a sufficient supply at Five Islands.

With regard to PETROLEUM, it appears that the total quantity of crude oil and distillate manufactured in the year ending June, 1876, was 4,838,215½ gallons, and Mr. Bell estimates the crude oil sent from Petrolia at 220,000 barrels. It is difficult to obtain correct figures with regard to the petroleum business of Ontario, but it is believed that there are still between 300 and 400 wells in the Enniskillen region capable of producing oil, about half of which were in operation during the last year. The industry gives employment to about 500 men in the production, and to about 300 in the refining of the oil. The greater part of the crude oil is refined at London, Ontario, where some 15 establishments are in operation. For some years back but little petroleum was exported from Canada; however, towards the close of 1876 a revival in the trade commenced, and considerable shipments of refined oil were made. By the improved processes of refining a perfectly colourless and thoroughly deodorised illuminating oil, standing a high fire-test, is now produced from our Canadian petroleum, at a price which enables it to compete in foreign markets with the best refined oils from the United States.

The most important fact of the year in connection with the SALT interest in Ontario has been the completion of Mr. H. Y. Attrill's boring at Goderich, which proves the great thickness of the rock salt under that region. It appears that six beds of solid rock salt were passed through, having an aggregate thickness of 126 ft. A considerable portion of this thickness Dr. Hunt found to be almost chemically pure, containing over 99½ per cent. salt. Mr. Attrill is about sinking a shaft to work these beds. The quantity of salt made in the whole of the Ontario region in 1876 was probably quite equal to that of the previous year, which amounted to between two and three millions of bushels. The returns with regard to gypsum were not to hand. In Nova Scotia and New Brunswick the average annual quantity was quarried and shipped. The demand for land plaster in Ontario is supplied from Northern New York, and from the comparatively thin beds of gypsum occurring along the lower part of the Grand River. The hydraulic cement consumed in the Dominion is supplied principally from Thorold and Limehouse. Should any considerable quantity of this material be required for the construction of the Pacific Railway it might be manufactured from certain beds of the Nepigon series of rocks at Thunder Bay, but the only way of determining the value of supposed cement stones is by actual experiment, as their chemical composition varies greatly, and every different kind requires some peculiarity in treatment suited only to itself. The granites of Canada may properly be noticed in connection with her other mineral resources. Mr. Robert Forsyth,

of Montreal, continues to manufacture monuments, pillars, &c., from the beautiful granite of his island near Gananouque. A hill of similar granite on the east side of the harbour of Kingston has been leased by the Hon. John Young, of Montreal. The Bay of Fundy Red Granite Company are doing a large business in manufacturing granite at St. George, New Brunswick.

FOREIGN MINING AND METALLURGY.

The past week has been a dull one in the French coal trade, and any opinions which may have been formed as to the probable effects of the war upon the trade have thus far not been found to amount to very much. The aspect of French home politics, as our readers are aware, has been rather troubled recently, and this has not improved the tone of the French coal trade. The summer opens in a discouraging fashion; as to this there can be no doubt. Some apprehensions are entertained as to the success of the crop of sugar-beet, and by consequence as to the beetroot sugar manufacturing season; this is, of course, another adverse circumstance in connection with the French coal trade. No interesting news reaches us from the Nord or the Pas-de-Calais; no material change is anticipated in the markets until the approach of winter. In the basin of the Loire there has been a slight—but only a slight—return of activity; prices have exhibited little change. A body formed under the title of the Association for the Improvement of Means of Transport has just issued an interesting and very complete map of the interior navigation system of France.

An improvement recently noted in the Belgian coal trade has not, perhaps, become more decided, but at any rate it is maintained. English coal has been rather advancing in price, and hence there has been a greater tendency to resort to Belgian coal. It cannot be said at present whether or no the firm tone observable will become more decided; but, upon the whole, buyers have shown more disposition to do business. The outbreak of war in the East of Europe has had something to do with the rise in English coal. The Council of Administration of the Crachet and Piquery Colliery Company reports that the production of coal effected by the company in 1876 was 143,937 tons, or 8681 tons more than the corresponding production for 1875. A dividend at the rate of 5 per cent. per annum, absorbing 6000*l.*, is to be paid for 1876. A sinking fund has been commenced with a view to the redemption of the share capital in 75 years; at the close of 1876 this fund amounted to 4613*l.* The net profit realised by the Herve Wergifosse Colliery Company for 1876 amounted to 4032*l.*, but it has been resolved to carry this sum to the "fund of foresight," and not to pay any dividend for the past year.

An association has just been formed in Germany, the object of which is explained by its title, "the Westphalian Coal Export Association." The Memorandum of Association is to remain in force provisionally for one year until April 30, 1878. Coalowners representing an annual output of 3,750,000 tons have already been enrolled, and an additional number of members is expected sufficient to bring up the total annual output represented to 6,000,000 tons. In an article on the subject, the Westphalian journal Gluckauf observes that "in the course of the last few years Germany's ability to supply coal to the markets of the world has vastly increased. No fewer than thirty large new pits have been sunk or are in process of sinking, while many of the old workings have been enabled by the discovery of new seams and the completion of their appliances to increase their output very considerably. Notwithstanding the depression in the iron trade, the Westphalian output was greater last year than at any previous time; while even in November, in spite of the continued stagnation of trade and the extraordinary mildness of the weather, a greater quantity of coal and coke was carried by rail than ever before. These facts, combined with the certainty that Germany in a very short time could increase her output 50 per cent., are naturally calculated to bring prominently forward the idea of establishing a German coasting and export trade in coal." Special arrangements with several of the railway companies for the transit of coal to the North Sea ports have now for some time past been in operation, and in the ports both of the North Sea and the Baltic manifold relations have been opened with Chambers of Commerce, mercantile firms, and wharf owners, with a view to promoting the consumption and export of German coal in the joint interests of those concerned. As we have from time to time reported, several cargoes have been already despatched to St. Petersburg, Riga, Spain, and other places, and additional contracts have been secured.

As regards Belgian metallurgical industry, we may note that the Angleur Steelworks have contracted to deliver to the house of Gouin, at Paris, the rails required for the Bona and Guelma Railway (Algeria). This is almost the only piece of intelligence which has to be communicated for the week, although some small orders have come to hand for merchants' iron, plates, nails, rivets, &c. Quotations are not very definitely established, and it is easy for buyers to enforce comparatively advantageous terms. Experiments are now being made at Brussels with a view to the introduction of steam traction upon tramways. A steam car, which is thus being tried, has been patented in the name of the General Tramways Company and MM. Bède and Co. The car was built in the workshops of the firm named at Verviers. Belgian industrials are beginning to direct some little attention to China as a possible future outlet for their products.

The aspect of the German copper markets has been rather unfavourable, transactions have been limited, while prices have been uncertain. Business in copper has been comparatively limited at Paris, but prices have somewhat improved. Tin has been firm at Rotterdam, but there has not been much business passing; disposable Banca has been firmly maintained at 44*l.*, but at this price very few transactions have been reported. Business has been passing at Rotterdam in Billiton at 42½*l.*, for delivery in July; the price has been 42*l.* The Paris tin market has been well supported, the German tin markets have been colourless, and prices have generally exhibited a downward tendency. Lead has been tending upwards at Paris; the German lead markets have also been firm. Zinc has been maintained with some difficulty at Paris; at Marseilles rolled Vieille-Montagne zinc has made 28*l.* per ton. Upon the German zinc markets the article has been greatly neglected.

Small orders by no means make default in the French iron trade, and prices have been sustained pretty well. Machine iron has been firm in the Haute-Marne, but the demand for pig has been generally weak. The treaties of commerce question is considered to have made some little progress in the French Legislature. The Chamber of Deputies has appointed a commission of 33 members, charged with the task of studying a bill relating to the establishment of a general customs tariff. The composition of this commission is not very bad; the majority of its members are favourable to the free trade policy inaugurated in 1860, and a reasonable reduction of duties is hoped for. A boiler in a French ironclad recently exploded; the incident occasioned, of course, a *grand* sensation. A contract for T-iron has recently been let in connection with the construction of the buildings for the French Universal Exhibition of 1878; the contract price was 13*l.* per ton. The Firminy Ironworks Company has concluded a contract for the delivery of steel axles, with wheels with full centres, to the Western of France Railway Company, at 18*l.* 14s. 6d. per ton. The Alais Mines, Foundries, and Forges Company has announced a dividend of 1*l.* 4s. per share for 1876.

APPLYING MOTIVE-POWER.—The invention of Mr. S. DAN-SHEFFSKI, of Wilna, Russia, consists in the employment of a box or barrel in which is placed a coiled spring from which the power is obtained; on one end of the barrel is a wheel with 200 teeth, which gears into a driving pinion having 21 teeth, and making 27 revolutions per minute. Upon the shaft of the said pinion is a wheel with 200 teeth gearing with a second pinion with 21 teeth, the shaft of which carries a third wheel with 200 teeth, driving a pinion with 21 teeth; on the shaft of this pinion is placed the fourth wheel with 200 teeth, which drives a pinion with 21 teeth placed on the shaft of the machine (such as a sewing machine) to be driven. A suitable brake is provided for stopping the machine, and also a proper spring and click work. The winding up of the spring is

effected by means of a winch handle and a wheel with 60 teeth, gearing with a pinion of 21 teeth upon the barrel arbor.

THE NEW QUEBRADA COMPANY'S MINES.

An exhaustive report upon the property of the New Quebrada Company, by Mr. John Darlington, M.E., who has just returned from Venezuela, has been issued to the shareholders, and although by no means encouraging as to the value of the property will enable them to determine with a view to develop the mines in such a manner as to secure them some return for their outlay. The mines known as Comaragua, Titiana, San Antonio, and Aroa, are on a belt about 5 or 6 miles by 3 miles, and 57 miles from Tucacas, a port on the Gulf of Trujillo. This port, 32 miles from Puerto Cabello, is reached by a small sailing steamer to six hours, the town being in a saline, quite flat and only 2 or 3 ft. above the level of the sea. There are railway buildings, the inhabitants of the small hotels, and two or three stores for the sale of provisions and other necessities brought from the River Turure, three miles distant, to the water terminus. The ore floor is close to the shipping quays, the ore being raised as received from the mines. Craft drawing over 6 ft. of water cannot reach the wharf, but must anchor half-a-mile off. The extension of the line from Tucacas wharf to a point on Brava Island, where ships could take in cargo direct from railway wagons, would be difficult and costly, so that for the present, at least, it seems to have been judicious to adopt Tucacas as the port. The country from Tucacas to La Luz is almost flat, made up of scall and river mud, while slightly beyond La Luz the ground rises, and is broken into low hills, the latter succeeded by a mountain range of sub-Alpine character, in which the Aroa Mine is situated.

The plain from La Luz to the coast, known as the Aroa Valley, is covered with a dense tangled vegetation and high trees, some of great diameter. A large portion, consisting of soft-wooded timber, is unsuited for industrial purposes. A lesser quantity comprises mahogany, rosewood, dye, and other useful woods. Removal of timber from a narrow strip of forest parallel to the line of railway could be somewhat readily accomplished, but beyond the margin of this strip it would be exceedingly tedious and expensive. In many places swamps would have to be crossed, the line of way cleared of thick undergrowth, and the timber required to haul the felled timber, which would frequently become entangled in the cable like "bejuques," stretching from the earth to the top of the highest trees. The Bolivar Railway is completed from Tucacas to La Luz, 30 miles, and the bridge-work partly completed. From the abrupt character of the country, and the tortuous lines of the ravines, the bridge-work and cutting are very heavy, rendering the progress of the contractors both slow and costly. The gauge of the railway is 2 ft. weight of iron rails from Tucacas to La Luz, 30 lbs. per yard. From La Luz to the mines the weight will be 40 lbs. per yard. From La Luz to La Hacha—46 miles—the road is tolerably level, the heaviest gradient from 1 in 50 to 1 in 25. Through the forest a space of 80 ft. in width has been cleared for the passage of the line of rail. The amount of work to be executed to complete the line from Casa de Teja to the mines is considerable. Looking to the fact that the mines are not yet opened, the railway, which is now being brought down by the Bolivar Company at the contract price by means of donkeys to La Luz, and thence by the railway.

Before noticing the mines Mr. Darlington notices matters which should be considered in estimating the results likely to accrue from the undertaking. The cost of living is much greater than in England. Six hours' labour in the mines, and eight hours' labour at the surface, constitute a shift, or one day's work, and a miner expects to earn 6s. 6d. per shift, while Italians and Frenchmen working very heavily are induced to give their services under a sum of 8s. per shift, so that in relation to the cost of native with mining labour in England and Australia, and regarding the shift into the ordinary one of eight hours' duration, peons demand more than twice the amount which satisfies a miner in Cornwall. The railway may lessen the cost of living and wages. The united population of the district served by the Bolivar Railway is but 1800 souls; very few of these are miners. The peons come from San Felipe, Guama, and Cocorote. There are 112 buildings in the year, leaving only 253 working days of six hours each, or 1518 hours of year of productive labour underground. The time in England and Australia is 590 days of eight hours, so that the dearth of labour in Venezuela is a serious drawback to the undertaking. The cost of charcoal delivered at the mines is 5s. per 100 lb., equal to 12*l.* per ton; this fuel is solely employed in the smelter's shop, where about 5 tons are consumed per week. Wood is used for domestic purposes. Dry wood, for burning lime kilns, and raising steam, costs about 16s. 6d. per ton, or equivalent to 5*l.* per ton of coal. The country affords but a small quantity of materials suitable for mining purposes. Boards and timber are excessively dear, considering the abundance of trees growing almost everywhere. Soft red tiles and bricks are made at the mines. Lime for building purposes costs from 50s. to 55s. per ton. All other materials are purchased in markets beyond the country. Hitherto the carriage of materials from the coast to the mines has been both slow and costly, according to the contract at present existing with the railway company, free charge. The Comaragua, Titiana, San Antonio and Aroa lodes are inclined within a belt of rock, not more than 3 miles in width and from 5 to 6 miles in length. Immediately beyond and in the vicinity of this belt no other lodes of value are known to exist. Comaragua is situated at the northern end of the belt, and is almost due north and south, and of great width—from 20 to 140 ft., and inclines at angles varying from 30° to 50°. This flatness of the angle or underlie is a characteristic of the various lodes, and to a certain extent explains the disposition of the ore at Aroa, which, running from wall to wall, appears rather as a thick floor than a vertical mass. From the explorations made it is not practicable to ascertain the general contour lines of the lodes, whether the walls are parallel to, or frequently approach each other, or whether the lodes are simply secondary fissures. At Aroa and Titiana the greater portion of the ore is contained in a crushed texture, while at Comaragua the lode is only distinguishable as two or three points. The filling up material consists of large quantities of oxide of lime, semi-indurated and plastic micaceous slate, various copper ores, and a limited quantity of iron pyrites.

At Comaragua the lode appears to be somewhat easy for exploration. The cost of carrying the ore by donkeys to La Luz would not exceed 15s. per ton, and large quantities were obtained a cheap cart-road could be constructed, and the price reduced to 7s. 6d. per ton. The amount of money required to clear out the Spanish level, to drive the Cornish shaft to the lode, and to extend a few fathoms upon it with the view of ascertaining its value, need not be considerable—perhaps 1000*l.* A fair extent of ground for working purposes could not, however, be soquired without running a level 10 fms. deeper than the Cornish level, the practicability of which cannot be known until the ground has been surveyed. Considering the various circumstances and the contingencies which are sure to occur, it would not be desirable to commence operations without being able to appropriate for that purpose a sum of from 7000*l.* to 10,000*l.* As to the San Antonio Mine, Mr. Darlington states that this part of the property is apparently of little value for bearing purposes. The people who explored the opening must have abandoned it almost immediately. There is no evidence of other tentative works in search of ore, nor, indeed, is there any perceptible circumstance to encourage anyone to make them. Before visiting the "mine" every care was taken not to mistake the workings, the various plans were consulted, and old people examined, and search made around the spot for a period of two or three days previous to the date of his visit. No other mine was found in the San Antonio locality, and all available information pointed to the correctness of the spot examined. But the extreme poverty—nay, almost destitute character of the place for mineral—suggests doubts if another San Antonio ought not to exist, although it is evidently unknown to the inhabitants or officers of Aroa.

With regard to the Titiana Mine, there appears to be a large lode 20 to 30 ft. wide, but with very little ore in sight, and that of unreliable percentage, samples assayed varying from 3½ to 33 per cent. Mr. Darlington considers that it would not be prudent to form any conclusions as to the average percentage until the lode had been explored to the ore until it had been extracted on a wide scale, and from a somewhat extensive area of the lode. Of the Old Santa Barbara level referred to in some old manuscript documents he could learn nothing. The two levels accessible for examination were named respectively El Tigre and Esperanza. The supposed entrances of two other levels were shown, but they only exhibited broken rock, embedded in a depressed surface or gullet. There is a limited quantity of water at high falls for power, dressing, and smelting purposes, and wood is obtainable in almost unlimited quantities. Mr. Darlington recommends a mode of attack, and points out what should be done if remunerative quantities could be obtained. He considers that it is generally certain that the Spanish level must have obtained considerable quantities of ore from the Titiana lode. Unless it had been sufficiently productive to justify the cost the various day levels would not have been driven, nor would special smelting works have been erected. Whether, however, the ore in the Titiana lode exists as lentils closely following each other, or widely apart, or as copper pyrites at the greatest depth attained, cannot be known without clearing out and re-opening one or two of the deepest levels. Having regard to the general circumstances of the property, to the time consumed for opening out the lode in an effective and miner-like manner, to the expense of labour, and assuming that the various works would be economically conducted, he is of opinion that the time requisite for determining the value of this part of the Quebrada property should not be limited to less than three years, and the funds available should not be under 20,000*l.*

The Aroa Mines are undoubtedly those upon which the company must, for some time at least, depend for returns. Of the cubic contents of the lode only a small proportion consists of ore, which appears to exist as lentils across the lode, and not parallel to the underlie of the lode. The form of the lentils, or concretionary masses, may be likened to an almond. In other words, the ore concretionary masses are of the almond shape, the ends of the almond being towards the lower edge. One mass of such ore is divided from another by the vein referred to. The carbonate and oxides of copper are mostly enclosed in the upper part of the lode. These ores are soft, and occasionally friable. The yellow oxides of copper include from 30 to 40 per cent. of iron, traces of sulphur, a little arsenic, zinc, manganese, oxygen, and insoluble matter. The copper pyrites contain from 35 to 40 per cent. of iron, from 34 to 38 per cent. of sulphur, from 1½ to 4 per cent. of lime, from 2 to 3 per cent. of arsenic, traces of manganese, zinc, nickel, and from 2 to 7 per cent. of insoluble matter. The metallic percentage of ore varies to an extent depending upon its purity or freedom from earthy matter. Assays of mere samples, although often absolutely necessary, may not represent the average percentage of metal in the mass. Mr. Darlington states that the Aroa lode is of extraordinary width on the line of the Spanish works, and as far as they are known exist within a length of 350 ft.; that the ore is connected with the saloons is probably of a quality inferior to that extracted by the Spaniards; that the quantity remaining in these saloons could not be estimated with any approach to accuracy, but is roughly taken at 10,000 tons; that the quantity of yellow ore available is reckoned approximately at 70,000 tons; that the question of roasting and reducing the ore at the mines can only be satisfactorily determined after one or two small cargoes have been sent at Swansea; that the cost of procuring 1 ton of ore, together with the cost of carriage, freight, commission, royalty,

MAY
and salaries,
offering no
Quebrada
worked for
the point
productive
profitable dur
In conclusio
course of a le
duty to be
Hypothetical
Aroa and Tit
contain larg
remembered
50 ft. that it
most mines
boldly de
operating to a
(We are)
together at
A PROPR
Company, I
220,000,000
of which 81
of the prop
tends to
January, 1877
company's c
mines. The
good milwa
for years.—
CRISMON
property of
500 ft. tw
making a t
of the vein
chambers li
lower tunnel
through qua
higher, ano
reaching the
are immedi
creedingly hi
to the m
very rich ve
levels, from
per ton; sele
400,000. T
greatest dep
—West, 100
about 150 ft
the ore. Climat
WEST
An extr
the offic
the chair
That the
holders her
there the
have ceased
is any and
the holders
elected al
of the ord
The m
secretary
The C
possibly
circular.
his hand
made not
retained
shape of
crisis. I
contain
holders s
this fresh
would m
that it w
deavour
understa
dozen of
lose a pe
the m
the mat
shares, a
profit to
the pre
oranges
whole of
have ha
Suppose
be the p
they en
boys gi
have se
once be
letter h
would,
nary sh
unders
it real
gentler
and app
should
say the
hands,
probab
now ge
who c
posses
hands
dead.
section
holders
public
The m
"Mining
be main
but the
written
direct
being a
the ad
memor
a slip o
upon
sario
of the
memor
do not
He h
been
con
as the
poi

and salaries, show that it is necessary to send from the mines to Swansea ore not less than from 12 to 13 per cent. of copper, dry assay; that the information available tends strongly to the conclusion that the Bolivar Railway and the Bolivar Company should be united, so as to allow both undertakings to be managed by the same company, and that various circumstances point to the necessity of applying the expenditure mainly to exploratory and development work, with the view of rendering the mines of permanent and profitable production.

In conclusion, Mr. Darlington remarks that he has been anxious throughout the course of a lengthy investigation to arrive at the truth. Before reaching the property he had fully acquainted himself with various reports relating to it, and felt it his duty to test with impartial care any definite statements which they contained. Hypothetical and extravagant calculations showing the value of the lode between the Arca and Titara have been disregarded. What can be fairly said is that it is likely to contain large and valuable deposits of ore. Reverting to the Arca lode, it must be remembered that it has only been effectively wrought for the trifling length of 100 ft., that it has undoubtedly afforded a large quantity of ore, but whatever the quantity it has not been profitable to work, the task will be to employ the means to render it profitable. Moreover, the lode should be systematically and boldly developed for the purpose of adding value to the property, and rendering it a satisfactory extent the large amount of capital involved in the enterprise.

[We are informed that the directors intend calling the shareholders together at an early date, to consider this report.]

A PROFITABLE MINING INVESTMENT.—The Calumet Hecla Copper Company, located in Michigan, with an original capital stock of \$2,000,000, in 80,000 shares, at their par value of \$25 per share, and of which \$1,200,000 were paid up in the course of the development of the property, has paid out to date no less than \$11,450,000 in dividends to its shareholders. The last dividend was paid in February, 1877, of \$5 per share. As may be supposed, the shares of the company command a high price—or are quoted at \$182 at latest prices. Their stamp-mill is eight miles distant from the mine by a good railway. It has been a veritable bonanza for its shareholders for years.—*Mining Record* (New York).

CRISMORE MAMMOTH is another highly reputed Utah mine, the property of Samuel McIntyre and Co. The greatest depth by shafts, 500 ft. two main working tunnels, with other levels and drifts, making a total of 1250 linear feet. Ore has been traced on the course of the vein, in the different levels, from 100 to 400 ft., and found in chambers from 6 to 30 ft. in width; 50 ft. below the level of the lower tunnel, and upward of 300 ft. from the surface, a cross-cut was made along the vein, striking the wall at the distance of 61 ft. from the shaft; 35 ft. lower, another cross-cut has been extended through ore 51 ft. to the west, without reaching the wall. In addition to large reserves of 26 per cent. copper ore, there are immense bodies of auriferous and argentiferous ores, some of which is of excellent grade. The great mass of the silver ore works from \$40 to \$100, and a considerable amount of high-grade, selected, runs from \$1000 to \$1500. A very rich vein of gold quartz was not long since struck, and cut on the different levels, from 10 to 14 ft. in width. The ore has an average working value of \$250 per ton; selected lots have sampled from \$25,000 to \$100,000, single assays reaching \$100,000. The yield last year was 2500 tons, with gross value of \$125,000.—*The Crismore*.

The greatest depth attained on some of the principal mines at Stockton are as follows:—West Extension, Silver King, 480 ft.; Muscatine, incline, 420 ft.; Isquiquis, incline, 190 ft. from face of incline; Legal Tender, 120 ft.; Great Basin, 268 ft.; and the others from 60 to 150 ft. The deeper the mines are sunk the richer the ore. Climate such that the mines can be worked the whole year round.—*Ibid.*

Meetings of Public Companies.

WEST GOGINAN SILVER-LEAD MINING COMPANY.

An extraordinary general meeting of shareholders was held at the offices, East India Avenue, on Thursday (Mr. WM. BROOKES in the chair), for the purpose of passing the following special resolution:—

That the special resolution passed at the extraordinary meeting of the shareholders held on Nov. 22, and confirmed on Dec. 7, 1876, be amended by adding thereto the words following, that is to say:—"That after the said new shares shall have been issued to the shareholders entitled to them, the profits of the company shall be divided into two equal parts, one part to be divided among the holders of the 2000 preference shares, including those who have already received allotments thereof, and the remaining three-fourths amongst the holders of the ordinary shares."

The notice convening the meeting having been read by the secretary.

The CHAIRMAN said he would endeavour, in as few words as he possibly could, to explain the object which he had in sending the circular, which he hoped they had all received. In its passage from his hands to those of the printer, the circular had passed through the hands of several leading members of the company, who had made some modifications therein, but the leading principle had been retained—that something more than usual should be given in the shape of advantage to the shareholders who come in at the present crisis. His letter, if it had gone out in its original form, would have contained a good deal more detail as to what the preference shareholders would gain and the ordinary shareholders would lose by this fresh arrangement, but it was generally thought that such detail would make it too complicated, and muddle up the scheme so much that it would be hardly intelligible. He would now, however, endeavour to put the matter in the clearest possible way. They must understand that this was a relative matter. For instance, if half-a-dozen of the shareholders were to give him a penny each he should be the fortunate possessor of sixpence, but the givers would only lose a penny each, so there was a great difference between the gain and the loss. He would use a plain illustration to show exactly how the matter stood. There were 12,000 ordinary and 2000 preference shares, a proportion of six to one. By giving a quarter of the net profit to preference and three quarters to the ordinary, we are making the preference twice as valuable as the ordinary. If I have four oranges to give to seven children, and I give a quarter, that is one whole orange, to one of them, it follows that the other six will only have half of one each. Then as to what the ordinary will lose. Suppose I have seven children, six boys and one girl, the girl would be the preference share. I have a basket of oranges, enough to give them eight each, but I want her to have the most, and so I make the boys give her one each, she will then have 14, and they will each have seven. By making the ordinary give up one-eighth the preference shares receive double the amount the ordinary receives. A letter had been received from a gentleman to the effect that there would, if the resolution were carried out, be a very heavy loss to the ordinary shareholders, but this really showed that the gentleman did not understand the matter, because by giving up one-eighth of a share it really took only one-eighth of a share from him. Another gentleman wrote to say that he heartily supported the proposition, and would send his 500. Mr. Attwood, the largest shareholder, fully approved of the scheme. Another reason why the fullest publicity should be given to the scheme was that the shareholders might not say they were deceived in case of the mine passing out of their hands, and afterwards turning out a splendid affair. They would, probably, have seen by the *Mining Journal* that a great dispute was now going on between a certain captain and some former people who owned a mine, who complained that whereas when they possessed it the mine made no returns, yet now that it was in the hands of the captain himself it was making very good returns indeed. Now, he had no wish that such a thing should occur in connection with this property, and, therefore, he wished the shareholders to know exactly how they stood. In a recent number of a public journal the following remarks were made with regard to this mine:—

"Much improvement is again reported at this mine; the lode is not only maintaining its character, but is improving as greater depth is attained. Patience must be manifested by the shareholders for a few months longer, and we have no fear that they will be amply rewarded. The new capital is being gradually absorbed by a section of the shareholders. It is not too late now to repair the omission. Let every member of the company at once inform the secretary that he will take his proportion, and the future of the mine is assured. If this opportunity is permitted to slip it will be a lasting source of regret to all concerned, for so sure as night follows day, and the spring succeeds the winter, is there a line band of capitalists anxiously waiting for the moment when they can profit by the parsimonious folly of some of the proprietors in this company. We say emphatically to the old members of the company—Be up and doing, take the few shares that remain, and do not let the ventures have it all their own way."

He had really no further remarks to make. There was but little opposition made to the scheme. It was giving more than had hitherto been proposed to persons who were willing to put money in the concern. On the preference shares it gave them 10 per cent. as long as the mine was struggling up, and when the mine reached the good position they had every reason to hope and believe it would, they

would get a permanent benefit in having the interest doubled. In conclusion, the Chairman moved the resolution given above.

A SHAREHOLDER said he had great pleasure in seconding the resolution. He was sure that if the mine were to prosper, the shareholders would become prosperous no one would for a moment accuse the Chairman and directors of having done all they possibly could to make the mine a success. There was little doubt that if the shareholders came forward and carried out this scheme in due course the mine would not only be in smooth water but in a paying condition. He himself had always had great faith in West Goginan, although hitherto it had been disappointing. At the present time they had gone no depth in the mine, comparatively speaking, but there was every prospect that in going down they would find a good mine. He thought the fact that Mr. Attwood had held his shares from the commencement, and still held them, was a very encouraging feature to the shareholders.

Mr. KEELEY said that Mr. Attwood knew most of the best mines in the neighbourhood, and had hitherto been very successful in all his speculations, and he fully agreed that it was very encouraging to know that the gentleman entertained a good opinion of the property, because he was a gentleman whose opinion was entitled to considerable weight.

A SHAREHOLDER said he saw there were only 638 shares now to be disposed of, and if these were not all applied for the 486 which had been disposed of conditionally would have to be cancelled. He thought it would be a very great pity if those other shares were not disposed of, and he sincerely hoped that the shareholders would come forward and take up those shares. He hoped that after the passing of the resolution the shares would be at once applied for.

In answer to a question, the CHAIRMAN said that if the shareholders did not take them all up the remainder would be offered to the public.

In answer to a question, Mr. HOWARD said he should be very sorry to see the mine given up at the present time, because he had a good opinion as to its future prospects.—The CHAIRMAN said that, of course, the present resolution would be retrospective in its action, and those who had already subscribed would receive the full benefit of it.

The resolution was then put and carried, and the meeting broke up.

PENNERLEY MINING COMPANY.

A special general meeting of shareholders was held at the offices of the company, Austinfriars, on Wednesday.

Mr. PETER WATSON in the chair.

The notice of meeting having been read, Mr. W. J. LAVINGTON (the secretary) read the following report:—

May 22.—There is very little alteration in the prospects of the mine since our report for the meeting on the 2nd inst., in consequence of the accident then reported. The engine started work yesterday afternoon, and continues to work admirably, and is working the water satisfactorily. If all goes well we calculate seeing the 80 by Monday morning next. The slope in the bottom of the 70 is worth 30¢ per fathom. A new slope in the back of this level has greatly improved, and is worth 30¢ per fathom. There is a fine piece of unwrought ground in this direction, to see the lode, where there is every encouragement to look for a course of ore. This will at once open up a new feature, and put us in a position for increased returns. The 120 and 130 east are also very encouraging points, only they require further development to render them abundantly remunerative. In conclusion, we beg to state with additional capital carefully expended this mine will yet prove a profitable one, and on our part all energy and economy shall be exercised in the furtherance of all points for the speedy and effectual success of this most desirable object.—W. T. HARRIS, J. DELBRIDGE.

The CHAIRMAN said that this meeting had been called for the purpose of confirming the resolutions passed at the special meeting held on the 2nd inst. The shareholders would remember that those resolutions were for the purpose of authorising the issue of 6000 preference shares at 11¢ each. The money was needed to meet the existing liabilities and to carry on the operations at the mine. He sincerely hoped that every member of the company would assist in taking these shares. Personally he believed in the mine, and felt sure that with further development the company would yet turn out a success. Before moving the resolution he would again impress upon the whole body of shareholders the necessity of interesting themselves in the success of this issue of new capital, for if not taken up, and that promptly, the company must come to an end. He would move that the following resolutions, passed at the special meeting held on the 2nd inst., be confirmed:—

"That the nominal capital of the company be increased by the sum of 12,000£, divided into 6000 shares of 2£ each; that the said shares be preference shares, and entitled to a preference dividend of 15 per cent. per annum on the full nominal amount thereof, in priority to any dividends on the ordinary shares; that the new shares be treated as fully paid up on payment of 11¢ per share, thereon, the shareholder not being liable to pay the other 11¢; that the new shares be in the first instance offered to the present shareholders of the company, in proportion to their holdings, and that if the offer be refused by any shareholders the shares so refused be issued in the discretion of the directors; that 5¢ per share be paid on application for the new shares, and 5¢ on allotment, and the remaining 10¢ be called up by the directors in their discretion, but no call to be made within three calendar months from the date of the allotment, as the case may be; that the preference shareholders have the right at any time within four years from this date to convert their shares into ordinary shares of the same amount; and that the Memorandum of Association of the company be modified so far as necessary to give effect to the foregoing resolutions."

Mr. GRACE, in seconding the confirmation of the resolutions, said he was glad to say that an improvement had been reported at the stopes at the 70 on Warm Water lode, and that the engine was working well. He would remind the meeting that the special object to which the new capital would be applied was the driving east towards Potter's Pit, on the Big Ore lode, and he advised that boring-machines be used. In reply to Mr. Bently, he said the level could be driven 5 or 6 fathoms a month; that at every 50 fathoms cross-cuts south 10 fathoms in length should be put out, which would intersect Warm Water lode, and similar cross-cuts to the Potter's Pit lode; both lodes would again be driven on when found productive. This method of exploring the deep section of the mine would be very simple, and there was no doubt in his mind that the run of ore which had accompanied the sinking at Potter's Pit to the 100 would be continuous. The appearances were exactly similar to the parallel lode worked in the Tankerville Mine, within a few fathoms of our boundary, and 100 fathoms deeper. Without estimating the value of the ore discovered by driving forward the 130, he calculated that Potter's Pit would produce, in and above the 130, 1000 tons of ore. In addition to this known deposit is Wilson's lode, situated between Big Ore and north lode, productive of good tributaries' ground. At Warm Water lode, 80 fm. level, the ore also appears to be lengthening, and it is anticipated that the cross-cut at the 120 will open a valuable section of ore ground.

The resolutions were then put to the meeting and agreed to, and the usual vote of thanks to the Chairman terminated the proceedings.

SCOTTISH AUSTRALIAN MINING COMPANY.

The report to be submitted by the directors to the half-yearly general meeting of shareholders, at the City Terminus Hotel, on Tuesday, gives the following particulars respecting the property of the Association:—

LAMBTON COLLIERY.

The company's sales of coal amounted to 75,143 tons for the half-year ending December 31, and the net profit realised from the colliery during that period to 12,866£ 10s., the necessary disbursements for maintenance and renewal having been made. The depression that has so long prevailed in all trade has continued to influence unfavourably the coal trade of the colony. Notwithstanding that two small additional collieries have been at work during the period now reported on, the total general production of all the northern collieries shows a falling off of 101,023 tons, as compared with the corresponding six months of 1876. The directors are glad to be able to state that the Lambton Colliery has obtained a full proportionate share of the trade. The railway and rolling stock, together with the colliery and its appliances, are reported by Mr. Croudeau, the colliery viewer, to be in good order and condition.

THE CADIA PROPERTIES IN NEW SOUTH WALES.

The buildings, machinery, and mining appliances on these properties have all been repaired and put in working order. The shafts and levels have been cleared, and the timbering where necessary repaired. A certain extent of new workings have been opened up, and by the latest advice 400 tons of copper ore, estimated to average nearly 10 per cent. for copper, have been raised. At the present depth, which is still a shallow one, being only 32 fms., the lodes have not been found to produce ore so largely or of so high a percentage as they did at and near the surface, whence a very large quantity of rich ore was raised, and it seems, therefore, that a more productive condition of the lode is to be looked for at a greater depth. In most metalliferous formations lodes which are found to be very rich at and near the surface, although they may become less so at a short depth down, are usually found at a further depth to resume a productive character, and to yield ore more regularly and permanently. This is a feature which is especially observable in the mineral deposits of the Australian colonies, and there seems no reason to think that these properties will form an exception to this general rule.

Two auriferous quartz reefs on the properties have been partially opened up to the depth of 120 ft., and 200 tons of the stone raised from one of them were, at the date of the latest advice, ready to be crushed as soon as there should be sufficient water in the creek (which had been much reduced by a severe drought) to set the turbine and stamps to work. A sufficient supply of the most approved ore dressing machinery has been sent out from this country, and one of the furnaces formerly in use having been repaired, smelting was commenced early in March last.

The completion of the railway from Sydney to Orange, which is situated within ten miles of the mines, has been announced, and was expected to be opened for traffic on the 1st of this month. The properties comprise 3272 A. O. R. 22 P. of freehold land; plans (Nos. 4, 5, 6, 7, and 8) of the same and the workings thereon accompany the report of the directors.

COPPER PROPERTY IN QUEENSLAND.

During the half-year now under review the operations at this property have been continued, two smelting furnaces having been completed, and some necessary buildings erected. Up to Feb. 7 68 tons of copper had been made from the ore raised from the mine, the whole of which was then in course of shipment to England; and there was at the date of the latest advice sufficient ore and regulus on hand to make about 32 tons more. From the plans of this property (which consists of 1614 A. 2 R. O. P. of freehold land) it will be seen that but a very shallow depth, 28 fms., has as yet been attained. The same features that have been alluded to as manifesting themselves in the Cadia properties are observable in this property also. The question of the best course to be pursued in dealing with this property has been receiving the anxious attention of the board and manager. The latter having recently paid a short visit to this country, during which the board have had the advantage of personal communication with him on this and other subjects of importance in the company's affairs, has just taken his departure for the colony, where he will carry into effect such measures as may seem best calculated to promote the interests of the company in regard to this property.

ACCOUNTS—DIVIDEND.

The balance of profit shown by the general revenue account (including the sum of 5399£ 19s. 11d. brought forward from the previous account) is 16,634£ 2s. 11d. The directors propose the payment of a dividend at the rate of 15 per cent. per annum on the paid-up capital of the company, 140,000£, free of income tax, which will require..... £10,000 0 0

And to carry forward to next account..... 6,134 2 11= £16,634 2 11

It is proposed to make the dividend payable on Tuesday, June 5.

DEVON GREAT CONSOLS COMPANY.

At the half-yearly meeting of shareholders, to be held at the office of the company, on Tuesday, the following report of the directors will be read:—

The quantity of ore sampled is in excess of that of the previous half-year, but not quite so much as was anticipated at the last meeting, operations having been hindered by weather and other causes beyond the agent's control. The mines report shows that the principal agent is still sanguine that an increased quantity may be shortly obtained for sampling. The continued fall in the price of copper has considerably militated against the company. The sales of arsenic have quite realised anticipations, the payments for which have been most regular, and highly satisfactory. The exploratory work required by the lessor has progressed considerably to the satisfaction of his agent, but as yet without any profitable result. The return on the royalty has been duly paid accordingly. None of the other items require observation, being such as usually appear at each meeting of the members.

The cash balance of 9125£ 2s. 7d. is sufficient proof of the success of the company, and if the sales of ore realise the anticipated amount next month the directors will have the pleasure of declaring a dividend in June or July.

Capt. J. Richards reports that "the ore reserves throughout the different mines amount to 33,340 tons, an increase during the past year of 1685 tons, and the new machinery for dressing the accumulations of halvas being now complete and in full working order, we hope soon to increase the returns to 1000 tons per month."

[For remainder of Meetings see to-day's Journal.]

PROSPECTS IN THE BREAGE DISTRICT.

In the midst of the murky darkness which has for so long a period settled down upon the tin mining industry of the county, it is cheering to hear of any district upon which the sun may be said to penetrate the almost universal gloom. We have grounds for stating that there are more than one such bright spot in this formerly renowned district.

At WEST GODOLPHIN, we learn that the adventurers have discovered very valuable lodes, which they consider they can work to much profit even at the present depressed prices for tin, and they have been so far encouraged by their bright prospects as to erect a powerful engine and stamping machinery at a very large expenditure, and a tall chimney stack is gradually rising from the ground at the present moment. We wish them all manner of success.

Proceeding farther to the immediate neighbourhood of Great Wheal Vor, formerly the giant of the district, but now, alas! numbered with the things of the past, we find, nestled in a green valley, another very promising undertaking, called POLROSE. Here a small work has been in progress for some time, and from small beginnings is gradually assuming large proportions. The one engine of moderate capacity, which has hitherto sufficed for both pumping and stamping, is now found inadequate for the increasing duty laid upon it, and the wanderer in Breage may now observe a second chimney shaft rearing itself up towards the sky. The adventurers here have been reduced, we learn, by numerous secessions to a very small company, but those that remain appear to be staunch miners, determined to give Polrose a fair trial, and it would seem that their enterprise is likely to be crowned with the success it so well merits. At 60 fms. below adit they have a junction of two masterly lodes with opposite underlies, forming at the junction a mass of lode exceeding 6 fms. in width, and of fair produce. This large deposit will pay well even at the present starvation prices of black tin, and the adventurers have very wisely determined to attack this enormous bulk by a battery of 80 heads of stamps, capable of reducing over 2000 tons monthly. They have already raised over 14,000£ worth of black tin, and fairly calculate upon concentrated mineral wealth in sinking below this magnificent deposit. We think they deserve every success, and hope they may attain to a large measure of it. These adventurers are further encouraged by the very liberal treatment they have received from the lord of the soil, who, in a manner which deserves to be held up for imitation to all the lords in the county, declines to damp the enterprise of his persevering tenants by taking money out of their pockets in the name of royalty. He has announced his intention of remitting all dues until the returns have begun to balance, and more than balance, the cost sheets, and something remains in the "dish" for the hard-working miner. This lord of the soil is Lord Churston—*si sic omnes*.

THE O'HARA CHAMPION FURNACE.

We are pleased to state that our confidence in the O'Hara Champion furnace, now in successful operation at the Exchequer Mill, has not been misplaced; it has been accepted by manager Chalmers for his company, and that gentleman is so well satisfied with its work that he ordered one of the same capacity for the I.X.L. Mill. The furnace is perfect in its mechanical arrangements, and runs like clock work. It has not been stopped a moment on its own account since starting. Before seeing the furnace at work we had some doubts as to the iron work standing the heat, but after seeing the plows and chains moving through the flames and red hot ore, and coming out of the furnace almost cold, we are satisfied that they are but little, if any, affected by the heat and gases, and the secret of this is they are in the heat only half a minute and out in the cool air one minute and a half, consequently they have no chance to become over heated while the furnace is running, and when it is stopped the chain is lowered in a groove or opening in the heart out of the heat by slackening the chain at one end, where the shaft is on a carriage, and so arranged as to be tightened or slackened by a ratchet. For the benefit of those who have not seen the furnace we will try to give a description of it. It is 85 ft. in length, with two hearths, one above the other as two furnaces, each 7 ft. wide. There are five chambers, one on the upper hearth which is used only for heating the furnace, after which the fire is allowed to go out, as the heat and gases arising from the lower hearth are sufficient to heat the ore and prepare it for chloridising on the lower hearth, on the sides of which there are four fires, two on each side. There is an endless chain that moves through a groove in the furnace and around large sheaves at each end and over the top outside. To this chain is attached two triangular frames, and to these frames are fastened a number of plows so arranged at a certain angle as to turn the red-hot ore to the right and then to the left, and at the same time move it forward a little every time they plow through it. The heat arising from the lower furnace ascends to the upper hearth through the flues and ore chutes, and is brought to bear on the ore as it is discharged from the battery and fed to the furnace, and moved forward by degrees by the plows, prepares it, or heats it up, evenly and gradually, ready for the chloridising heat of the lower hearth. When it reaches the opposite end from where it is fed it drops through an opening or chute to the lower hearth or lower furnace; from thence it moves in contact towards the discharge end and through the flames, a space of about 75 ft.

As the ore is moved forward in contact with the first fires of the lower hearth it gives up a portion of its sulphur, and changes to a sulphate. After passing the first fires it receives oxygen from openings on each side of the furnace, and from that on the chlorination progresses. As it is moved toward the second or last fires the draught is so arranged that it is equally divided, and looks as though it hardly knew which way to go—in fact, the chlorine gases arising from the bed of ore stop there, hovering over the ore as the ploughs expose a new surface every minute, thereby causing the ore to chloridise to very near 100 per cent. of the fire assay. For instance, on an average sample of a 48-hours' run on low grade ore (that was run through to get it out of the way) the chlorination was found to be 94 per cent.—within 6 per cent. of the fire assay. The furnace was built for a 30-ton furnace, but it is found that it will easily work 40 tons in 24 hours. With this furnace a number of steam pipes, with superheaters, are connected, and so arranged as to throw jets of steam, and cause a rush of oxygen to mix with the flames, but it is found to be unnecessary to use them on the Exchequer ore, as the bed of ore stop there, causing the ore to chloridise to very near 100 per cent. of the fire assay. The cost of roasting 20 tons of ore in 24 hours is as follows:—One man, 34¢; one man, 3¢; wood—13¢ cords, at 31¢ per cord, 55¢; salt—1600 pounds, at 2¢ cents, 32¢; cost of 20 tons, 85¢; cost of 1 ton, 32¢ 61¢.

Mr. O'Hara says he can build a 100-ton furnace that would make the cost of roasting much cheaper. We learn that the Advance Company, at Monitor, are negotiating with Mr. O'Hara for the erection of two 30-ton furnaces this spring. The people of this country may rejoice that our rebellious ores have been subdued. Alpine is wealthy in her mountains, and capital to be well directed by

energetic men would soon place her in the front rank with the best mining districts in the world.

Since the above was put in type Manager Chalmers informs us that since the furnace was accepted by him it has done its work still better, working up to 100 per cent.—up to the full assay value—stamping it as the best reduction furnace in existence.

THE I.X.L.—This mine has a 4 ft. ledge of fine ore in the adit level.

ANOTHER O'HARA FURNACE.—Brick makers have arrived here for the purpose of manufacturing brick for another O'Hara furnace to be erected at the I.X.L. mill.

EXTRAORDINARY WORK.—The O'Hara furnace at the Exchequer mill was erected on a contract to work the ores as close as 94 per cent. During its first run, and up to the time it was accepted by Manager Chalmers for his company, it worked up to 96 per cent.—two per cent. higher than the contract called for; but this week it astonished Mr. Chalmers by working up to a clean 100 per cent.—to the full assay value of the ore. This will seem to be an exaggeration, but we are assured it is strictly true.

NEW FOREMAN.—Manager Chalmers has placed the Exchequer Mine under the foremanship of A. B. Jackson, of Virginia City, an experienced miner. Under Mr. Jackson's management we anticipate good reports from this mine.—*The Chronicle*, April 28.

SUBMARINE TELEGRAPH APPARATUS.

With a view to obtain by the mere influence of the very feeble currents provided by submarine cables contacts ensuring the closing of the circuit of a local pile, and to apply the Morse system to submarine telegraphy, so as to obtain printed Morse signals instead of signals thrown by the mirror of Thomson's galvanometer, Count EMILIO DI SICCARDI, of Turin, proposes to replace the ordinary mirror galvanometer into a relay galvanometer, the distinctive feature in which consists in the employment of mercury to establish the contact intended to close the circuit of the local pile. At the centre of a circular plate of wood is mounted upon a copper foot a galvanometer bobbin. The wire in the bobbin is of very small diameter, and is twisted a sufficient number of turns upon the bobbin to obtain a resistance of from 3500 to 4000 ohms. The current from the line passes through the spirals of the galvanometer, and then goes to earth. In the line of the axis of the bobbin and at the ends are placed two bronze supports, the bases of which are adjusted in a groove of a cross piece, also of bronze. The supports slide with gentle friction in their grooves, so that their position can be regulated as desired. Each support carries an arm, in the opening of which is placed the moveable system of the apparatus. This system is composed essentially of a small axis of aluminium, with steel points pivoting between the platinum points of two screws. Upon this axis is fixed a very light magnetised needle, provided upon one of its ends with two sharpened platinum points. These points are situated opposite the extremity of a tube, also of platinum, electrically isolated from the metallic mass of the apparatus, and filled with mercury. It is between these platinum points and the little drop of mercury that the projection of the orifice of the tube occurs, which establishes the contact intended to close the circuit of the local pile. The tube is screwed into a support, which enables it to be easily brought into a convenient position.

The amplitude of the oscillations of the needle is limited by two screws with ivory points. The axis of each magnetised needle is crossed by a little rod of aluminium bent into a right angle at its middle, and dipping by the flattened extremity of its vertical part into a silver cup filled with water. This arrangement is for the purpose of preventing any oscillation of the magnetised needle other than that provoked by the emission of a line current. Two permanent magnets, mounted upon heavy bronze feet, are placed on each side of the galvanometer. They are approached or separated at will. Each of them serves, firstly, to call back the neighbouring needle to its original position after each deviation; secondly, to regulate the influence of the line current upon that needle; thirdly, to neutralise the influence of the terrestrial poles which do not fail to act upon the magnetised needles of the apparatus. When it is desired to use the apparatus the supports are moved one towards the other, so as to introduce the two systems pivoting from 15 to 20 millimetres in the interior of the bobbin. The latter must be sufficiently long that the needles thus approached towards one another may not be reciprocally influenced. The exterior magnets are suitably placed so that their antagonistic force upon the magnetised needles may be in relation to the force of the line current. A pole of the local pile is then united with two isolated tubes, and the second pole with the metallic mass of the apparatus, and consequently with the two magnetised needles. These needles are placed so that their poles of contrary denominations are opposite to one another, so that under the influence of any line current they always deviate in opposite directions. It will now be understood that by the emission of a current in one direction one needle arrives into contact with the mercury, so as to close the local current, becoming a printing receiver, the other needle remaining in repose; by the emission in the contrary direction the needle which has just made contact remains in repose, and the second needle closes in its turn the local circuit.

Originally the local pile was arranged with two different circuits, each comprising a tube and an armature of a printing receiver; the two armatures acted independently and inscribed one of the points to the right and the other to the left of the same band of paper according to the direction of the line current, printed despatches were thus printed in the same manner as they are read on the graduated scale of Thomson's galvanometer, but this system presents several difficulties in its application. It is well known that when several currents are sent successively through a submarine cable in the same direction, as must be done for certain letters, these currents gradually diminish in strength. It is known also that the Varley condenser preserves during these emissions, and up to the passage of an inverse current, a charge which prevents the mirror of the Thomson galvanometer from returning to zero. In the present apparatus these defects would be very injurious—firstly, because the successive currents in the same direction would become too feeble to produce the deviations of the needles; or, secondly, because under the permanent charge of the line resulting from their emission there would be produced an adherence of the needle to the mercury probably too strong to be overcome by the exterior magnets. To avoid these difficulties use is made of a manipulator sending the currents alternately in opposite directions, and which always closes the same local circuit. This manipulator has the general form of a "Morse" key, but differs from it by this addition. The touch or cross piece is provided with a catch acting upon a ratchet, upon the axis of which is placed an inverter. The latter is composed of three little copper wheels of the same diameter; the middle wheel communicates with the earth by a friction spring, and the lateral wheels with the metallic mass of the manipulator by two other friction springs. These wheels have an equal number of teeth at their circumference, the breadth of which is one quarter of a turn. The teeth of the middle wheel have intervals separating the teeth of the lateral wheels. Two springs communicating each with a pole of the pile of the line rub at the circumference of the three wheels. When the touch of the manipulator is lowered the inverter makes a half turn, and the friction springs put the one, a pole of the pile (zinc for example) in communication with the middle wheel—that is to say, with the earth, the other, the second pole of the pile, in communication with a lateral wheel—that is to say, with the metallic mass of the manipulator, and consequently with the line. When the touch is lowered again these effects are reversed. The currents of a same pile can then be sent on the line by reversing them continually, which avoids all remanent charges.

It will be now understood that it will be no longer possible to print despatches so that they can be read in the same manner as those obtained upon the graduated scale of Thomson. It is also necessary to observe that upon submarine lines one absolutely cannot, as one can in aerial lines, obtain currents of a duration variable at will suitable for the impression of points or strokes as in a Morse receiver. It is for this reason that it becomes indispensable with the present instrument to make a little change in the Morse alphabet. The points of the alphabet are always represented by points spaced a certain amount (.), and the strokes by two points a little less separated (.). The slight inconveniences which may result from this new manipulation differing so little from that used up to the present time will be largely compensated for by the advantages possessed henceforth of producing in submarine cables

all the effects possible with a contact closing a local circuit. One could, for example, obtain translation, and, perhaps, even make use of the Hughes apparatus.

THE SCOTCH MINING SHARE MARKET—WEEKLY REPORT AND LIST OF PRICES.

During the past week business has continued very limited, owing to the Whitsuntide holidays. In shares of iron and coal concerns, Ebbw Vale are 2s. 6d. higher per share, while Nan-y-Glo and Blairston (pref.) are reduced 10s., and Glasgow Port Washington 2s. Benhar, Cairnstable, and Scottish Australian (new) unaltered. Bolckow, Vaughan, A. are at 49 to 50; ditto, B. 34; and ditto (pref.), 20. Cardiff and Swansea, 40s. Chatterley, 25 dis. Chillingworth, 6s. 10d. John Ragnall and Sons, 65s. to 70s. Ljyvi, Tondra, and Ognore, 5 to 10. Nan-y-Glo and Blairston (pref.), 19 to 20. Newport Abercrombie, 57s. 6d. Pelsall, 80s. Sandwell, 19, for old and new. West Cumberland, 12½ dis. Shares of foreign copper concerns all low. Cape are reduced, 20s.; Tharais, 10s.; Huntington, 3s.; and Canadian Pyrites, 1s. Fortuna are at 5½; New Quebrada, 40s. to 60s.; Rio Tinto, 5 percent., 56; Yorke Peninsula (ordinary), 4s. to 5s.

In shares of home mines, Glasgow Caradon are raised 61. The last sale of copper ore by this company, computed 240 tons, on the 17th inst. realised 9000. 4s., or an average of fully 75s. 4d. per ton; as low a price as this has only been reached twice previously since September, 1873; it compares with the same quantity at 84s. 6d. last month, at fully 99s. 9d. in May, 1876, at 118s. 6d. in May, 1875, and 120s. 6d. at 93s. in May, 1874. Cambrian shares have been enquired for. Aberdunant are at 13s. 6d. Bampfylde, 4s. 3d. to 4s. 9d. Bodidris, 2s. 6d. Cargoll, 80s. Combmartin, 7s. 6d. Dolcoath, 33½. Great Laxey, 20½. Leadhills, 6. Llanrwst, 45s. Maellyr, 20s. Parys Mountain, 7s. 6d. to 10s. Pennerly, 7s. 6d. to 10s. Rookhope, 19s. St. Patrick, 25s. South Condurrow, 8½. South Lolearne, 12s. 6d. Tankerville, 7½. Tincroft, 17. Van Corsens, 42s. 6d. West Tankerville, 19s. 3d.; ditto (pref.), 35s. to 45s. West Main, 2s. 6d. West Tolgus, 60. Wheel Agar, 5s. to 70s. Wheel Uny, 25s. to 30s. In shares of gold and silver mines, Richmond have advanced 13s. 9d., while Flagstaff are 2s. 6d. lower. The advices from Chontales are slightly better. Pestarena firmer. Antioquia are at 10s. to 20s. Battle Mountain, 20s. to 40s. Chicago, 55s. Eberhardt, 7½. Emma, 1s. 3d. Exchequer, 11s. Frontino, 45s. I.X.L., 14s. 3d. Last Chance, 8s. 9d. Pestarena United (Gold), 2s. 6d. to 5s. Santa Barbara, 38s. South Aurora, 2s. 6d. to 5s. St. John del Rey, 310.

Shares of oil concerns all lower. Young's Paraffin being reduced 22s. 6d., Uphall 5s., and Oakbank 6d. In shares of miscellaneous companies, Scottish Wagons are 2s. 6d. higher. London and Glasgow Engineering, &c., unaltered. Birmingham and Midland Counties Val de Travers are at 25s. Hopkins, Gilkes, and Co., 9 dis. Shares of chemical companies are quoted as follows:—Langdale, 75s. 3d.; Lawe's, 6½ to 6¾; and Newcastle, 60s.

LLANRWST LEAD MINING COMPANY (Limited).—A circular issued informs the shareholders that reports as to insufficiency of water for dressing purposes are fallacious, and a report from Capt. Knapp is annexed, stated to be the most important ever sent from the mine. Reference is made to shares in the company sold by parties who cannot deliver them, which does not seem necessary.

SCOTTISH AUSTRALIAN MINING COMPANY (Limited).—The report to be submitted at the meeting, on May 29, for the six months ending Dec. 31 last, states that the sales of coal have been 75,148 tons, and the net profit 12,856½ 10s., and the balance of profit shown by the general revenue account, including 5309½ 19s. 11d. brought forward, is 16,634½ 2s. 11d., from which the directors propose the payment of a dividend at the rate of 15 per cent. per annum, which will leave 613½ ½s. 11d. to carry forward. The directors announce that the depression so long affecting all home trade has continued to influence unfavourably the coal trade of the colony. Satisfactory reports are given of the Cadia properties in New South Wales, and the copper property in Queensland. The report, plans, and accounts are of the usual clear and satisfactory nature.

UPHALL OIL COMPANY (Limited).—At the annual general meeting of this company, on Wednesday, the report and accounts were unanimously adopted. The Chairman stated the dividend would have been considerably more but for an extraordinary expenditure of 2978½, to clear off liabilities and bad debts incurred prior to the past year beyond the amount in contingency account. Towards the maintenance and extension of the various works and plant of the company 3999½ had been expended from revenue, and the property account had been reduced by 2995½. To increase the productive powers of the works the directors had expended 5764½, which had been placed to property account, and the new works erected at Hopetoun were yielding of crude oil an increase equivalent to about 35 per cent. The refinery at Uphall was being enlarged and improved by the removal of the plant at Benhar, which had not been in operation for some years; and, in order to add still further to the efficiency of that department, a new refrigerator was being erected. New leases of mineral fields had been entered into on very favourable terms to the company. Looking to these new leases, the addition made to the crude oil plant, the extension of refinery, the erection of the new refrigerator, and the great economy introduced into the different manufacturing processes, the Chairman said he looked forward with confidence to the future, even though there should be no rise in the price of burning oil. What the directors aimed at was to put the works into such a state of efficiency that the company would be able to compete with the American oil refiners at the lowest price at which they could import petroleum, and at the same time pay the shareholders a good dividend. The price of oil was much higher during a period of the past year than for some years previously, but the advance took place, unfortunately, too late for the mineral oil companies to reap the full advantage.

YOUNG'S PARAFFIN LIGHT AND MINERAL OIL COMPANY (Limited).—The directors have resolved to recommend a dividend at the rate of 17½ per cent. per annum, and, after deducting the usual depreciation, a balance of 26000, will remain to be carried forward.

Subjoined are this week's quotations, &c., of mining and metal shares quoted on the Scotch Stock Exchanges:—

Per share.	Paid up.	Previous.	Last.	Description of shares.	Last price.
£0	47	£ 8½	£ 6½	COAL, IRON, STEEL.	81s.
10	10	6	6	Arnstion Coal (Limited)	18
10	10	6	6	Benhar Coal (Limited)	9½
10	10	6	6	Ditto	7½
100	45	18s. 9d.	11s. 6d.	Bolckow, Vaughan, and Co. (Lim.)	49
10	10	nil	nil	Cairnstable Gas Coal (Limited)	7½
10	10	nil	nil	Chillingworth Iron (Limited)	80s.
10	10	nil	nil	Ebbw Vale Steel, Iron, and Coal (Lim.)	9½
10	10	nil	nil	Fife Coal (Limited)	40s.
10	10	nil	nil	Glasgow Port Washington Iron & Coal (L.)	43s.
10	10	nil	nil	Ditto Prepaid	1
10	10	nil	nil	Lochore and Caplethrae (Limited)	82s. 6d.
10	10	nil	3	Marbella Iron Ore (Limited)	74s. 6d.
10	10	nil	nil	Monkland Iron and Coal (Limited)	50s.
100	10	5	4	Ditto Guaranteed Preference	5
10	10	nil	nil	Nan-y-Glo and Blairston Ironworks (Pref. L.)	19½
10	10	1	1	Orma and Cleland Iron and Coal (Lim.)	25s. 6d.
10	10	1	1	Scottish Australian Mining (Limited)	37s. 6d.
10	10	1	1	Ditto New	10s.
Stock	100	5	5	Shotts Iron	97

Per share.	Paid up.	Previous.	Last.	Description of shares.	Last price.
4	4	—	—	COPPER, SULPHUR, TIN.	15s.
10	7	20s.	20s.	Canadian Copper Pyrites (Limited)	15s.
1	1	15	15	Cape Copper (Limited)	37
1	1	15	15	Glasgow Caradon Copper Mining (Lim.)	23s. 6d.
10	15s.	15	15	Ditto New	16s.
10	9½	15	15	Huntington Copper and Sulphur (Lim.)	26s.
25s.	23s.	—	—	Kapunda Mining (Limited)	61.
4	10	nil	nil	Paraguay Copper (Limited)	25s.
10	10	nil	nil	Rio Tinto (Limited)	75s.
20	20	—	7	Ditto 7 per cent. Mortgage Bond	12½
100	100	—	5	Do. 5 p.c. Mor. Deb. (Sp. Con. Bds.)	53
10	10	nil	nil	Russian Copper (Limited)	40s.
10	10	22½	20	Tharais Copper and Sulphur (Limited)	23
10	7	22½	20	Ditto New	18s.
1	1	—	—	Yorke Peninsula Mining (Limited)	7s. 6d.
1	1	—	—	Ditto, 15 per cent. Guaranteed Pref.	21s. 3d.

Per share.	Paid up.	Previous.	Last.	Description of shares.	Last price.
1	1	—	—	GOLD, SILVER.	8s. 9d.
10	10	—	—	Australian Mines Investment (Limited)	8s. 9d.
5	5	—	—	Flagstaff Silver Mining (Limited)	50s.
5	5	—	—	Last Chance Silver Mining (Limited)	10s.
5	5	7s. 6d.	7s. 6d.	Richmond Mining (Limited)	61s. 1s. 3d.
10	7	5	6	OIL.	8½
1	1	—	—	Dalmieny Oil (Limited)	52s. 6d.
1	1	—	—	Oakbank Oil (Limited)	14s.
10	10	—	—	Ditto	8½
10	10	—	—	Uphall Mineral Oil (Limited) "A"	10
10	8½	8	9	Ditto "B" Deferred	14½
50	25	10	5	MISCELLANEOUS.	26½
20	14½	—	—	London and Glasgow Engineering & Iron Shipbuilding (Limited)	10½
10	10	6	6	Peruvian Nitrate (Limited)	11½
10	4	6	6	Scottish Wagon (Limited)	90s.
10	4	6	6	Ditto New	90s.

Last day for this account, May 28; settling day, May 31.

NOTE.—The above lists of mines and auxiliary associations are as far as can be ascertained, Scotch companies only being inserted, or those in which Scotch investors are interested. In the event of any being omitted, and parties desiring a quotation for them and such information as can be ascertained from time to time to be inserted in these lists, they will be good enough to communicate the name of the company, with any other particulars as far as possible.

Post Office Buildings, Stirling, May 24.

THE VRONBOULOG SLATE COMPANY.—An order has been obtained to wind-up this company. The affairs of the company were flourishing and were carried on at a profit, but it was necessary that fresh capital should be raised, and

the parties could not agree as to the mode in which the money was to be obtained. Mr. Rodwell appeared for the petitioners, Mr. T. A. Roberts for some of the holders, and Mr. Dryden for the company. The Vice-Chancellor made a winding-up order, considering that this course would be likely to lead to some arrangement between the parties for providing the requisite capital.

THE TYLDESLEY COLLIERY EXPLOSION.—Mr. Thomas Fletcher, jun., owner of the Great Boys Colliery, Tyldesley; John Howell, manager; Joseph Deakin Yates, fireman; and Thomas Robinson, shotlighter, were summoned at the Leigh Police Court, on Monday, for contravening the Mines Regulation Act on March 6, when an explosion occurred which caused the loss of eight lives. The formations were laid by Mr. Dickinson, Government Inspector. The Mr. Leresche appeared to prosecute on the part of the Treasury. Addison, instructed by Mr. Read, defended Mr. Fletcher; Mr. Richardson defended Howell and Yates, and Mr. Pennington defended Robinson. The case against Robinson was first taken for evidence of sub-section 1 of the 8th general rule, and of the 12th special rule, which provided that where gas had been seen within the month no shot must be fired unless it be by a competent person appointed for that purpose. Mr. Leresche only pressed for one person against the defendant, and said he should show there was gas in the pit on Dec. 29 and twice in January. Evidence having been given, the Bench fined the defendant 2½ and costs.—The defendant Yates was fined 2½ and costs.—Mr. Leresche, in opening the case against Howell, said it was evident there had been the gross neglect in the management of the colliery. The defendant was fined 2½ and costs.—Mr. Leresche, in stating the case against Mr. Fletcher, read a letter written by the defendant to Mr. Dickinson, who sent it to the Home Secretary, a course which Mr. Addison, who appeared for Mr. Fletcher, strongly opposed, on the ground that it was confidential and was written at Mr. Dickinson's request. The letter was dated March 17, after the inquest, and said the neglect of the fireman shotlighter exposed a serious state of affairs, of which they had been before ignorant, promised to make such immediate reforms as were necessary, and expressed a willingness to take proceedings against the fireman and shotlighter. Evidence showing that the defendant was one of the firm was then submitted, after which Mr. Addison held the defendant could not be supposed to be liable, inasmuch as he had a business to conduct embracing 14 collieries, miles apart, as well as being a cotton spinner. Under such circumstances the responsibility in this case, if any, fell upon the manager, to whom was delegated the fullest authority.—The Bench fined the defendant 2½ and costs, the Chairman (Mr. Jabez Johnson) saying they were unanimously of opinion that the case had been proved.—Mr. Addison gave notice of appeal.

COPPER ORES.

Sampled May 9, and sold at Swansea, May 22.

Mines.	Tons.	Produce.	Price.	Mines.	Tons.	Produce.	Price.
Cape Ore	72	299½	£29 4 0	Adjusted Ore	68	47½	£47 10 0
ditto	71	299½	24 4 0	ditto	68	47½	47 10 0
ditto	71	299½	20 0 0	Carracedo	67	124½	8 10 0
ditto	71	299½	19 19 0	ditto	67	124½	8 10 0
ditto	62	29	19 10 0	Negrillo Ore	98	124½	5 8 0
ditto	62	29½	1 17 6	Cranebane Ore	95	2½	1 10 0
ditto	45	37½	25 8 6	Copper Ore	36	50½	1 10 0
ditto	37	17½	11 5 0	ditto	20	9½	6 0 0
ditto	11	29½	20 0 0	ditto	2	13½	9 4 0
ditto	2	53	22 9 6	Copper Reg.	9	28½	26 0 0
Portuguese	79	24½	18 17 6	ditto	2	46½	31 10 0
ditto	69	24½	16 17 6	ditto	7	34½	24 15 0

TOTAL PRODUCE.

Cape Ore	575	£11,428 9 0	Negrillo Ore	98	£5 12 6
Portuguese Ore	139	£235 12 6	Cranebane Ore	95	£19 5 0
Adjusted Ore	134	£441 8 0	Copper Ore	36	£79 8 0
Carracedo Ore	200	£1,610 1 0	Copper Regulus	19	£49 8 0

By this sale, the total produce of the mines was £12,887 10 0.

COMPANIES BY WHOM THE ORES WERE PURCHASED.

Names.	Tons.	Amount.
P. Grenfell and Sons	127	£2,312 12 0
Nevill, Druce, and Co.	89	1,745 5 0
Vivian and Sons	666	5,217 1 0
Williams, Foster, and Co.	344	5,320 6 0
Charles Lambert and Co.	154	2,873 12 0
Sweetland and Co.	87	416 5 0
Total	1317	£17,687 1 0

TOTALS AND AVERAGES.

Whole sale.	21 cwt.	Produce.	Price.	Per unit.	Standard.
1317	19½	£13 8 7	13s. 5d.	£8 8 8 4	

Copper ores for sale on June 5.—Cranebane Ore 94, 6, 111, 99.—Cape Ore 67, 69, 55, 25, 3, 1.—Berehaven Ore 170, 109.—Knockmahoe Ore 138.—Emly Ore 62.—Carrish Ore 10, 9.—Tigrany Precipitate 12.—Copper Regulus 5, 6.—Total, 1215 tons.

COPPER ORES.

Sampled May 3, and sold at the Royal Hotel, Truro, May 17.

Mines.	Tons.	Price.	Mines.	Tons.	Price.
Devon Great Consols...	49	£6 9 0	Gunnislake (Clitters)...	84	£12 12 0
ditto	87	2 4 6	ditto	78	6 5 0
ditto	81	2 5 0	ditto	76	4 10 0
ditto	76	2 9 6	ditto	72	5 5 0
ditto	75	2 2 6	Glasgow Caradon	73	4 4 0
ditto	72	6 5 6	ditto	70	3 10 0
ditto	69	2 12 6	ditto	61	4 4 0
ditto	68	2 6 6	ditto	28	2 10 0
ditto	63	2 5 6	Brookwood	50	3 14 0
ditto	58	4 9 0	ditto	49	2 10 0
ditto	57	7 1 0	ditto	48	2 10 0
ditto	49	5 0 6	ditto	41	2 10 0
ditto	5	24 10 6	Hington Down	72	2 10 0
South Caradon	85	4 0 6	ditto	64	4 4 0
ditto	61	5 6 6	ditto	63	7 5 0
ditto	59	11 7 6	Levant	62	7 5 0
ditto	55	3 19 6	ditto	2	35 10 0
ditto	54	4 16 6	Bedford United	75	3 10 0
ditto	48	6 14 0	ditto	40	4 8 0
ditto	42	4 16 6	West Maria & Portcuse	70	3 10 0
ditto	77	4 4 6	ditto	40	4 8 0
Marke Valley	73	8 1 6	East Caradon	56	5 5 0
ditto	65	3 2 0	ditto	54	5 5 0
ditto	55	3 19 0	Whael Russell	68	6 6 0
ditto	53	3 17 0	North Levant	12	12 12 0
ditto	40	2 16 6	Whael Emma	39	2 10 0

tion with the detaching apparatus of mine cap

By this last-mentioned arrangement the jaws are locked instantaneously on to the ring, and the possibility of their being shaken off and the consequent dangers avoided, and owing to the feather being so rare it is impossible for the jaws to be released I by striking the pit sides or bunting, or by anything falling on to it, for should one feather be so struck and one jaw released the winding wire is still firmly held, and accidents from such causes are thereby prevented. Another advantage consists in the fact that the action of disengaging does not commence until the jaws are in a proper position to catch the ring, and therefore all danger of what has been termed a partial overwind, and the consequent inopportune closing, is avoided. They prefer that the ring into which the apparatus enters in the case of an overwind should, instead of being set into a beam, be bedded on elastic and bolted by means of its flanges to two beams of timber, thus obviating the necessity for pulling away the timber as at present.

Journal of Management Education 26(7) 809-821

5-J, 1/52 It.

Boilers constructed according to this modification of the invention when dismantled may be transported in several pieces to the place where they are to be set up, and there may be mounted without difficulty, as when the smoke boxes at the front and back of the boiler are placed in the position they occupied before the re-

HEAT.—In continuing his lectures at the Royal Institution, Prof. Tyndall, with the aid of the thermo-electric pile and the galvanometer, illustrated the consumption of heat in the conversion of crystals into a solution, salt consuming more heat in the process than sugar, and saltpetre more than common salt. This illustration was continued with alcohol and ether, showing the consumption of heat in the vaporisation of liquid. Water, placed under the air pump in company with sulphuric acid, which consumed the vapour of the water, could be frozen in that way. A simple experiment of this kind was shown—a glass vessel containing water was connected by a tube with another glass vessel exhausted of air, and covered with a cloth wetted with salt and water; the vapour from the water passing into the empty vessel was condensed, and during the course of the lecture the water, thus deprived of its heat, became frozen. With reference to the heat produced and liberated in molecular processes, Prof. Tyndall stated that 8 lbs. of oxygen and 1 lb. of hydrogen, combining to form 9 lbs. of water, produced an amount of heat which, expressed in mechanical force, would be sufficient to lift 47,000,000 pounds a foot above the earth's surface—in other words, its effect was equal to 47,000,000 foot-pounds. The first effect of the combination was to produce aqueous vapour, and in the passage of that vapour to water the amount of heat set free would be equal to the raising of 6,720,000 lbs. a foot above the earth's surface. In the passage of the 9 lbs. of water to ice, the heat liberated would be equal to 993,654 foot-pounds. In treating of the subject of liquefying gases, Prof. Tyndall produced snow from carbonic acid gas, and froze quicksilver in the process of melting the snow. In connection with this experiment, he referred to the deposition of snow upon the Alps by the rarefaction of the air blown from the plains of Lombardy; in the process of rarefaction work was done, in the doing of which heat was expended, and by the consequent reduction of temperature the moisture held in the air became condensed, and fell as snow.

BALANCED HIGH-PRESSURE ENGINES.

The success achieved in the application of Bourne's patent high-pressure high-speed engines has already been noticed in the *Mining Journal*, and the inventor's reply to certain objections which have been raised against them affords another opportunity of mentioning them. He remarks that those who are conversant with such subjects very well know that it is not merely the weight which has to be balanced in fast-moving engines, but also the momentum. The whole of the momentum of the reciprocating parts is discharged at the end of each stroke upon the crank pin, and this would occasion a jerk and shock but for the introduction of an equal and opposite momentum which constitutes the balance, and which enables the work to be done as smoothly as if there were no reciprocation at all. Fans, centrifugal pumps, circular saws, and other rotating apparatus run smoothly at any speed. So will steam-engines do if the momentum of the reciprocating part is balanced by counter-weight, and this is precisely what is done in these engines. It has been objected again that these engines require a pressure of 100 lbs. to 150 lbs., whereas ordinary engines will work with from 15 lbs. to 35 lbs. with ease. To this the reply is that the engines do not require any greater pressure than other engines. But there is a plain difference between what is necessary and what is advisable. As the engine is a high-pressure one, any relevant comparison can only be with other high-pressure engines. And what competent engineer would recommend a high-pressure engine to be worked at 15 lbs. or even 35 lbs.? In all high-pressure engines the steam has to escape into the atmosphere, and, therefore, against a pressure of 15 lbs. per square inch. This back pressure has to be deducted in every case, and it is relatively very much larger when the impelling pressure is only 15 lbs. above the atmosphere than when it is 120 lbs. above it, which last is the pressure employed in Bourne's engines.

With regard to the advantages which the high-pressure high-speed system offers, Messrs. JOHN BOURNE and Co., of Mark-lane, the manufacturers, very truly observe that when people buy engines what they want to buy is power. They do not want to buy magnitude, or weight, or needless cost, or complication, and so long as the power is assured, combined with strength and durability, the smaller, the lighter, and simpler the engine is the better they will like it. The small cost of their engine, relatively with the power generated, speaks for itself, and the same may be said of its other most conspicuous qualities. Then, as the high-speed of piston enables them to carry expansion to a very large extent without entailing inconvenient magnitude, and as the cylinders are steam-jacketed, and all other aids to economy have been availed of, the consumption of coal is very small. The almost continuous abstraction of steam from the boiler, incidental to the high-speed, enables the boiler to work without priming, even with a very moderate amount of steam-room, whereas priming is very apt to occur in slow engines, from the steam being drawn away in large gulps. It is clear that high-speed is conducive to equality of motion, which, for many purposes, is important, and in no case detrimental; and they think a fair consideration of what they here state will lead impartial inquirers to the conclusion that they have put forth no pretension in regard to their engines which they are not able fully to justify.

SOCIETY OF ENGINEERS.

The Transactions of this Society for 1876* have just been issued, and contain eight papers of considerable general interest, and the discussions which followed the reading of them. The recipients of the Society's premiums for the year were Henry Davey, for his paper on the Underground Pumping Machinery at the Erin Colliery, Westphalia; Charles E. Hall, for his paper on the Conversion of Peat into Fuel and Charcoal; and J. W. Pearce, for his paper on the Ventilation of Buildings.

The President for the year was Mr. Vaughan Pendred who, in his inaugural address, made several very useful suggestions. He has a very exalted opinion of the engineering profession, but enunciates it with surprising modesty, considering his reputation therein; so that when his assertions are reduced to logical form they are absolutely unanswerable. He states that in the highest sense of the term an engineer is a man who can not only invent or devise but execute; in a subsidiary sense every man who can construct is an engineer. Such an admirable definition can offend no one, for it will include not only the Telfords, the Stephensons, and the builders of such elegant bridges as that which recently doubled-up in Germany, but also the entire manufacturing population of the world, from Sir Joseph Whitworth to the itinerant tinker; it will account, too, for the freedom with which the title of engineer is assumed by men of all classes and possessing various degrees of knowledge, and should have the effect of largely increasing the number of members of that useful society of which Mr. Pendred is the able representative. Admitting that every man who can construct is an engineer, there will be less difficulty in accepting the President's gratifying assurance that the whole army of engineers—civil and mechanical—has operated from the earliest ages to the present moment in the achievement of a great work, no less a work than the civilisation of mankind, and that he is enunciating a great truth in declaring that engineers have done more to raise men to the high level which they now occupy than even the philosopher or the statesman; that engineers are the great civilisers of mankind, and that nearly all that is good, or pleasant, or worth having in modern life—happy engineers!—results from their labours; and he maintains that if it be not within the power of our profession to dissipate the clouds which have long hovered over this country, the members of no other profession can.

By way of suggestion he remarks that English engineers would do well to display a little more energy than they have recently done in suggesting new works—new operations which will either afford good investments for capitalists, or will promote the well-being of the people of this nation. With regard to the Society of Engineers itself, his suggestions are not only valuable but equally applicable to printing societies generally. He remarks that the society has been formed that its members may mutually instruct each other, the form of instruction consisting in the reading and discussion of papers, and their publication. If there be no papers, the object of the society is frustrated; they are the life-blood of the body. It is an erroneous popular idea that a paper must be very elaborate and illustrated by a host of diagrams. But a paper ought not to be a treatise. Every member has some speciality, and knows more about some engineering subject than about any other; he is, therefore, competent to teach others something about his speciality. He need not teach in long pages of words, and may be able to say all that is required in five or ten minutes. In truth, the society is in danger of being sunk under ponderous papers: they get very few, and they are so big. Why should we not, the President asks, have as many as two or three short practical papers read every month? They might all be read the same night. The labour of preparation would be small. They should be put together with care, of course, but there would not be much hard work in them. The general adoption of the class of paper recommended by Mr. Pendred would unquestionably have a most beneficial influence on the vitality of a society.

With regard to the papers contained in the volume, the first is by Mr. P. F. Nurey, the secretary, on the Channel, advocating the scheme of Mr. P. J. Bishop, which has been already noticed in the *Mining Journal*. In the discussion which followed Mr. Backham showed that the character of the Channel bed had not been sufficiently studied, and the reply of the author of the paper did not give evidence of an acquaintance with the history of the formation of the Straits of Dover by the separation of England from the Continent, or of the changes going on upon the French and English coasts even within historical times, which would suffice to prove the absurdity of any scheme for constructing a communication with any hope of durability above the Channel bed, whether by tube or bridge. Mr. Spice made observations which, if considered and worked out, leave no doubt that the prospects of even making a tunnel through the solid are very discouraging; and Mr. H. W.

* Society of Engineers. Transactions for 1876. Edited by PERRY F. NUREY, M.S.E., secretary. London: E. and F. N. Spon, Charing Cross.

Pendred complained of the absence of evidence that the Channel railway if constructed would pay. It has already been shown in the *Mining Journal* that to secure the capitalists supplying the money 3 per cent. upon their investment it would be necessary that, besides the goods traffic that might pass over the line, the entire populations of London and of Paris should travel over it daily. Mr. Nurey estimates an expenditure of 25,000,000, for effecting the communication, and only hopes for a revenue of 2,500,000, which is equal to 10 per cent. on the capital. One of the many errors he makes is in considering this amount as available for dividends, whereas a far larger sum would be necessary for working expenses and keeping the railway in working order. Mr. Cargill did not believe that a tube, tunnel, or bridge would ever pay as a commercial enterprise, as the proceeds would be earned upon only 21 miles of railway, which was but a very small portion of the total distance between London and Paris; he regarded local sewage schemes as one in which remuneration or payment could not be hoped for.

The other papers are on Air Compression, by A. H. C. Trewman; on Stone Machinery, by Henry Conradi; on the Rolling of Ships, by Wm. McNaught; and those which have already been mentioned as having been awarded premiums. The Transactions are admirably and carefully edited, and will form a really useful work of reference.

REDUCTION OF SILVER ORES.*

The ores raised at the Tajo Mine, at Rosario, near Mazatlan, are essentially mixtures of quartz with argentic sulphide, and probably some silver and gold, together with some galena, brown blende, and pyritic minerals; the average contents of silver being 40 ozs. and of gold 2½ ozs. to the ton, with from 6 to 8 per cent. of lead and zinc. The reduction is effected by the American method of pan amalgamation without previous roasting. The ore is partially divided by hand-picking into rich and poor classes, without, however, attempting to remove any of the lead or zinc minerals, which are passed by a mill of 20 stamper heads, with rotating lifters weighing 7 cwt., and making 60 9-in. strokes per minute, through grates having apertures ½ in. in diameter, 24 tons being stamped daily. The slimes pass first into a pit 33 ft. deep, and 9 ft. in cross section, where the richer material forming the normal ore for the pans is deposited, after which a second collection of poorer stuff is made in a second pit of the same size, and finally the waste, together with that from the pans, is passed through a series of catch-pits 9 ft. long, 5 ft. broad, and 33 ft. deep.

The reduction of the richer slimes is effected in pan amalgamators of the improved Varney pattern, which perform the three operations of grinding the particles of ore to impalpable mud, mixing the particles with the chloridising agent, and reducing and amalgamating the silver minerals. The pan is essentially a mill, with cast-iron instead of stone grinding surfaces, which is adopted partly from economy and partly from the property possessed by iron of reducing the mercurial chlorides. These surfaces are put together in segments, so as to be easily renewable, as they are worn out in 40 days when worked at 70 revolutions per minute. The charge of the pans is 800 lbs. of ore stuff from the stamps, which is mixed into a thin mud by adding water and running the pan for half-an-hour or an hour until the materials are sufficiently ground. During this period a jet of steam is introduced in order to warm up the contents to 176° Fahr. Chloridising and reducing agents are then added in the following proportions—sulphate of copper 4 lbs., salt 40 lbs., and mercury from 70 lbs. to 90 lbs., including ½ lb. of zinc amalgam, or about 13 times as much salt and 32 times as much mercury as is used in the Mexican or "patio" process of amalgamation. The copper salt is added in somewhat larger quantity than would be required for the chlorination of the whole of the silver, assuming it to be effected by cupric chloride. The reactions are considered by the author to be substantially the same as those in the "patio" process, and as probably occurring in the following order—amalgamation of metallic silver and gold; conversion of cupric sulphate into chloride; conversion of silver sulphide by cupric chloride, with the formation of cuprous chloride, into silver chloride; reduction and amalgamation of the latter by metallic mercury; and, finally, decomposition of the mercurial chlorides formed by the iron of the pan. The zinc amalgam is said to help by the production of electric currents. Like the Mexican process, the method is not well suited for the treatment of minerals containing lead, zinc, or antimony, the working of such ores being attended with a considerable loss of silver and mercury.

The amalgamation process proper requires about four hours, the progress of the operation being controlled by washing out samples of the mud at intervals, and observing the colour and form of the mercury globule obtained, which should be grey, and "tail," or assume an oval form.

The finished charge from the pan is received in a cylindrical washing vat, or settler, and allowed to rest for an hour, whereby the bulk of the mercury and amalgam separate from the mud, and fall to the bottom. Afterwards the lighter particles are removed through a hole in the side by a stream of water, which flows for 50 minutes; lastly, the bulk of the mercury is separated from the remaining heavy mud charged with ore, by drawing it from a lower opening for 10 minutes. As the amalgam is very poor, owing to the large quantity

* From JAMES FORREST'S "Abstracts of Papers in Foreign Transactions and Periodicals," for the Proceedings of the Institution of Civil Engineers.

of mercury used, only the excess of the latter introduced at each washing above a large fixed amount is removed in clearing the settler. The whole quantity being only removed at intervals of eight days. The waste or tailings of the first operation, consisting largely of heavy metallic sulphides, with probably some silver sulphide, and containing about 35 per cent. of the original amount of silver, are reworked in four large pans or "tailing mills," which take charge of double the weight of those worked in the ore pans, but are otherwise similarly arranged. An assay of this material gave 28 ozs. of silver per ton, and appeared by vanning to consist of 9-10ths of quartz, and 1-10th of heavy sulphides, pyrites, blende, and galena. The reagents used per 1600 lbs. charge are—salt 40 lbs., sulphate of copper 5½ lbs., and mercury 120 lbs., the latter being about 70 times the weight of the silver in the ore.

The working of the tailings both in the pans and settlers is exactly similar to that in the ore mills. The waste from the last washing, containing about 1 oz. to the ton, is passed through a catch-pit before being allowed to run to waste. A further quantity of 20 per cent. of silver is recovered by the second operation, showing the final loss to about 15 per cent. of that contained in the ore. Allowing for the ore, counting from the first charging of the ore-pan, is effected in 16 hours. The amalgam collected is treated at intervals by filtration through canvass, after which it is washed in quantities of a few hundredweights at a time in a pan with water to clear it from mechanical impurities, filtered a second time, and finally heated in retorts holding 1200 lbs. The time required for distillation is from 8 to 15 hours, on account of the great variability in its composition. The sponge silver for the retorts is melted in blacklead crucibles holding 50 lbs., and run into bars.

The great advantage of the pan process, as compared with other metallurgical operations—speed and cheapness of work, together with large production from a small plant, are, in the author's opinion, obtained by a considerable waste of silver, which he calculates at 18.7 per cent. of the total quantity, and as due to the effect of lead and zinc ores. Nearly the whole of the gold is, however, saved. The loss of mercury is 2 lbs. per 2000 lbs. of ore treated, or 80 per cent. of the weight of the silver. The staff required is very small. With 12 men of all descriptions about 17 tons of ore are treated per day. The machinery is driven by steam power, the cost of working two engines being about \$1 daily. The total cost of working, including wages, materials, wear of machinery, &c., is about 2½ per cent. of ore treated, or about 1s. 2d. per ounce of silver recovered.

—By H. RICHTER: Zeitschrift für Berg-Hütten- und Salinenwesen.

HEATING WATER FOR STEAM-ENGINES.—The construction of the apparatus proposed by Mr. JOHN COLES, of St. George's-road, Regent's Park, is to consist of three cylinders of unequal diameter, so as to be inserted in each other, and forming a space between each for the exhaust steam and water. The innermost or smaller cylinder is to receive a portion of the whole of the exhaust steam, and passing through the same into the outer or larger cylinder, and returning back over the central cylinder, and thereby enclosing with exhaust steam internally and externally the space caused both by the smaller and central cylinders which contains the water to be heated. The space in the small cylinder and of the large cylinder which contains a constant supply of exhaust steam is very large compared with the space which contains the water to be heated, which is being pumped or injected cold in one end of the cylinder, and is passed out of the other end into the steam-boiler at a boiling point in-tantaneously on putting the engine in motion for work, thereby giving a constant supply of boiling water caused by the utilising of the exhaust steam after having given its power to the engine.

PLANING AND SLOTTING MACHINE.—The invention of Mr. Geo. BAILEY, of Crews, consists in applying two cutting tools to planing, shaping, slotting, and other similar machines, which tools are brought alternately into and out of operation, so that one of the tools is always in action, as the article to be operated upon is moved to and fro. Each cutting tool is fixed in a separate slide forming a duplex tool box, and these slides are raised and lowered alternately by a double cam fixed on a shaft on which is a worm-wheel, which is turned partly round by a worm fixed on the same shaft as a pulley. The ordinary self-acting feed gearing in connection to a lever which is fixed to a driving pulley, and as this lever is moved up and down by a feed gearing a band from the driving pulley gives motion to the pulley on the worm shaft, and thereby raises one of the tools and depresses the other, or the cam shaft may be acted upon by a lever direct from the feed gearing, or in any other convenient manner. By this invention a great saving in time is effected, as the machine is rendered double acting—that is to say, one tool is always in operation both in the forward and in the return stroke.

HOLLOWAY'S OINTMENT AND PILLS.—OLD SORES, WOUNDS, AND ULCERS.—The readiness with which Holloway's ointment removes all obstructions in the circulation of the vessels and lymphatics explains their irresistible efficacy in healing old sores, bad wounds, and infolent ulcers. To insure the desired effect the skin surrounding the diseased part should be fomented, dried, and immediately well rubbed with the ointment. This will give purity to the blood and strength to the weakened nerves, the only conditions necessary for the cure of all these hideous ulcerations which render life almost intolerable. No sooner is this ointment's protective power exerted than the destructive process ceases, and the constructive business begins. New healthy growths appear to fill up the lately painful excavated pit.

BORING AND SINKING.

WILLIAM COULSON AND SON

Are prepared to UNDERTAKE BORINGS for MINERAL EXPLORATION, either from the SURFACE or UNDERGROUND WORKINGS; BORINGS for WATER SUPPLIES or TUNNEL SOUNDINGS, &c., at fixed prices, according to the size of bore-hole required; also to EXAMINE and REPORT upon the BEST MEANS to SECURE DEFECTIVE TUBING.

Plans and specifications prepared for Shaft Tubing, Wedging Cribbs, Pumping, and General Sinking Arrangements.

Address: W. COULSON AND SON, SHAMROCK HOUSE, DURHAM.

TO COLLIERY PROPRIETORS.

IMPROVED "REGISTERED" SECTIONS OF SCREEN STEEL.



THE DOTTED LINES SHOW THE ORDINARY SECTION, AND THE DARK GROUND THE IMPROVED SECTIONS.—A saving of at least 30 per cent. is effected by the great reduction in weight of material.—For price and particulars apply to—

JOEL EATON WALKER, STEEL MERCHANT, SHEFFIELD.

NOTICE.—These Sections are Registered.

J. WOOD ASTON AND CO., STOURBRIDGE

(WORKS AND OFFICES ADJOINING CRADLEY STATION),

Manufacturers of

CRANE, INCLINE, AND PIT CHAINS,

Also CHAIN CABLES, ANCHORS, and RIGGING CHAINS, IRON and STEEL SHOVELS, SPADES and FORKS, ANVILS, VICES, SCYTHES, HAY and CHAFF KNIVES, PICKS, HAMMERS, NAILS, RAILWAY and MINING TOOLS, FRYING PANS, BOWLS, LADLES, &c., &c.

Crab Winches, Pulley and Snatch Blocks, Screw and Lifting Jacks, Ship Knees, Forgings, and Use Iron of all descriptions. STOURBRIDGE FIRE BRICKS AND CLAY.

MAY 26, 1877.]

BARROWS & STEWART, ENGINEERS, BANBURY,

MANUFACTURE

PORTABLE Steam Engines

With Gear for
Finding, Pumping, and
Ore Crushing; also

Combined Mills and Engines,

WITH OR WITHOUT
BOILERS,
for Grinding Slag, Sand,
Mortar, &c.

PORTABLE STEAM-ENGINE
FOR SALE. 25-horse
power; also 18 and 14-horse;
with or without pit-wind-
mill and pumping gear.

FOR SALE, an 18-horse com-
bined vertical ENGINE, and
MILL.

Also a combined 6-feet PAN
MORTAR MILL, and vertical
ENGINE, with BOILER.

FOR SALE, a new 6 feet PAN
MORTAR MILL, and a good
second-hand 6-horse power por-
table STEAM ENGINE.

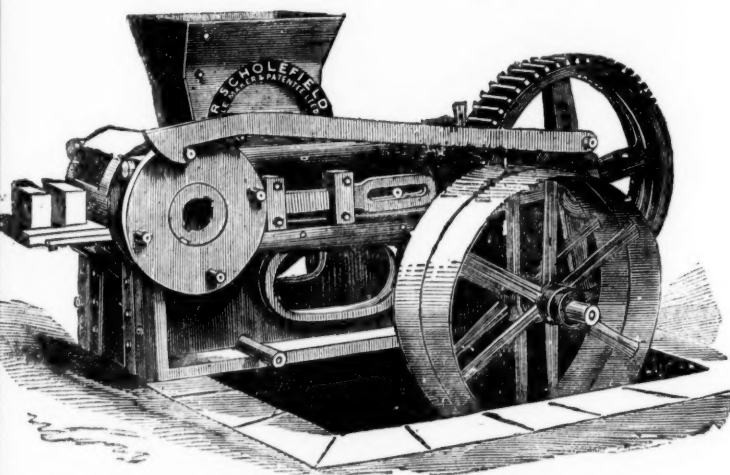


BARROWS & STEWART, Engineers, BANBURY.

R. SCHOLEFIELD'S LATEST PATENT BRICK-MAKING MACHINE.

PATENTED 1873.

R.S. begs to call the attention of
all Colliery Owners in particular to
his PATENT SEMI-DRY BRICK
MACHINE, and the economical meth-
od of making bricks by his patent
machinery from the refuse that is
taken from the pits during the pro-
cess of coal-getting, which, instead
of storing at the pit's mouth (and
making acres of valuable land use-
less), is at once made into bricks,
at a very small cost, by R. S.'s Pa-
tent Brick-making Machinery. If
the material is got from the pit hill,
the following is about the cost of



production, and the hands required to make 10,000 pressed bricks per day:—

2 men digging, each 4s. per day	...	8 0
1 man grinding, 4s. 6d. per day	...	4 6
1 boy taking off bricks from machine, and placing them in barrow ready for the kiln, 2s. per day	...	2 0
1 boy greasing, 1s. 6d. per day	...	1 6
1 engine-man, 5s. per day	...	5 0
1 man wheeling bricks from machine to kiln, 4s. per day	...	4 0
Total cost of making 10,000 pressed bricks	...	21 5 0, or 2s. 6d. per 1000.

(SETTING AND BURNING SAME PRICE AS HAND-MADE BRICKS.)

N.B.—Where the material can be used as it comes from the pit, the cost will be reduced in digging.
As the above Machinery is particularly adapted for the using up of shale, bind, &c., it will be to the advantage of all Colliery Owners to adopt the use of the
Patent Brick-making Machinery.

THE MACHINES CAN BE SEEN IN OPERATION AT THE WORKS OF THE SOLE MAKER AND PATENTEE DAILY.

SCHOLEFIELD'S ENGINEERING & PATENT BRICK MACHINE WORKS,
KIRKSTAL ROAD, LEEDS.

THE ROANHEAD ROCK DRILL. BY ROYAL LETTERS PATENT.

This justly-celebrated Rock Drill, the only one invented that will
work in the hardest rock without more than the usual repairs re-
quired by any ordinary machinery, is now offered to the public.

It has been most successfully worked in the well-known Hematite Mines of Lancashire and Cumberland. Will drive 50 to 60 ft.
in hard rock without change of drill, and can be worked by any miner, and kept in repair by any blacksmith. It is the most
simple rock drill ever invented, and cannot with fair usage get out of order.

Plans, Estimates, including Compressors, and all other Mining Machinery, supplied on application to the sole makers.—

SALMON BARNES AND CO.,
MINING ENGINEERS.

Canal Head Foundry and Engineering Works, Ulverston.

ALEXR. WILSON & CO., VAUXHALL IRONWORKS, LONDON, S.W.,

MANUFACTURERS OF



THE VAUXHALL DONKEY PUMPS.
THE EXCELSIOR DIRECT-ACTING
PUMPS.

HIGH-PRESSURE SCREW ENGINES.
COMPOUND SCREWS ENGINES.

PATENT SURFACE CONDENSING
ENGINES.

PATENT PADDLE ENGINES.

HOISTING MACHINERY.

ILLUSTRATED AND PRICED CATALOGUES ON APPLICATION.

PATENT

"INGERSOLL ROCK DRILL," LE GROS, MAYNE, LEAVER, & CO.,

60, Queen Victoria Street, London, E.C.

5, PARK PLACE, NEW YORK, U.S.A.



We claim 40 per
cent. greater effec-
tive drilling
power, and offer
to compete with
any machine
of its
class.

See following ex-
tracts from the re-
ports of Judges in
awarding Medals:—

"2. Its simple
construction ensures
durability. &c.

"4.—The steam or
air cushions at each end of cylinder effectually protect from injury.

"5. Its having an automatic feed, giving it a steady motion, &c.

"6. Its greater steadiness and absence of jar and vibration ex-
perienced in other drills, which is very destructive to their working
parts, &c.

"7. Its greater power is some FORTY PER CENT. in favour of the
Ingersoll."

Medals awarded for several years in succession "For the reason
that we adjudge it so important in its use and complete in its con-
struction as to supplant every article previously used for accom-
plishing the same purpose."

Estimates given for Air Compressors and all kinds of Mining
Machinery. Send for Illustrated Catalogues, Price Lists, Testi-
monials, &c., as above.

SHUNTING.

OVER 3000 OF THE RAILWAY TRUCK AND
CARRIAGE SHUNTER now in use.

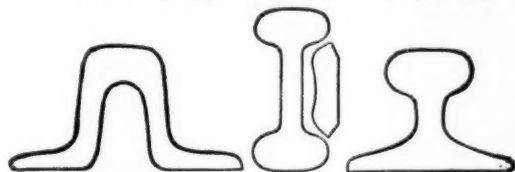
(HESHUYSEN'S PATENT.)

For particulars and Illustrated Price List apply to—

F. G. AND W. FRANCIS,

RAILWAY SHUNTER FACTORY, FOLKESTONE.

JOHN BEATSON, DERBY.



IRON AND STEEL RAILS, of all sections, from 10 to 82 lbs. per
yard, new, defective, or second-hand.

POINTS AND CROSSINGS, FISH PLATES, BOLTS, NUTS, CHAIRS,

AND SPIKES. LOCOMOTIVE ENGINES AND MACHINERY.

MALLEABLE AND PIG-IRON OF ALL KINDS.

Delivered at all Ports and Railway Stations in Great Britain.

A SECONDHAND SIX-WHEELED TANK LOCOMOTIVE FOR SALE.

INCREASED VALUE OF WATER-POWER.

THE EXTRAORDINARY ADVANCE in the PRICE of COALS
has DIRECTED more ATTENTION to WATER POWER, and to the
BEST MANNER of APPLYING IT. For many years it has been, to a great
extent, neglected and undervalued. One great objection to it has been the variable
nature of most streams in these countries, having abundance of water during the
winter half-year, and very little in the dry season. No kind of wheel hitherto
known was able to give the proper proportion of power from the smaller quan-
tities of water, so that it became the practice very generally to use steam entirely
during the summer half of the year, letting the water go to waste. This is now
completely prevented, and the full available power can be obtained from a stream
at every season by using

Mac Adam's Variable Turbine.

This wheel (which is now largely in use in England, Scotland, and Ireland) is
the only one yet invented which gives proportionate power from both large and
small quantities of water. It can be made for using a large winter supply, and
yet work with equal efficiency through all variations of quantity down to a fifth,
or even less if required. It is easily coupled to a steam-engine, and, in this way
always assists it by whatever amount of power the water is capable of giving, and,
therefore, saves so much fuel.

This Turbine is applicable to all heights of fall. It works immersed in the tail-
water, so that no part of the fall is lost, and the motion of the wheel is not affected
by floods or back-water.

References to places where it is at work will be given on application to the
makers—

MAC ADAM BROTHERS AND CO.,
ENGINEERS, BELFAST.

LA HOUILLE (Weekly Journal) represents the IRON and
COAL TRADES of FRANCE. Advertisements referring thereto, and sub-
scriptions, 20s. per annum, post paid, received by the London Agents, EDWARD
CASPER and Co., 40, Finsbury Circus, E.C.

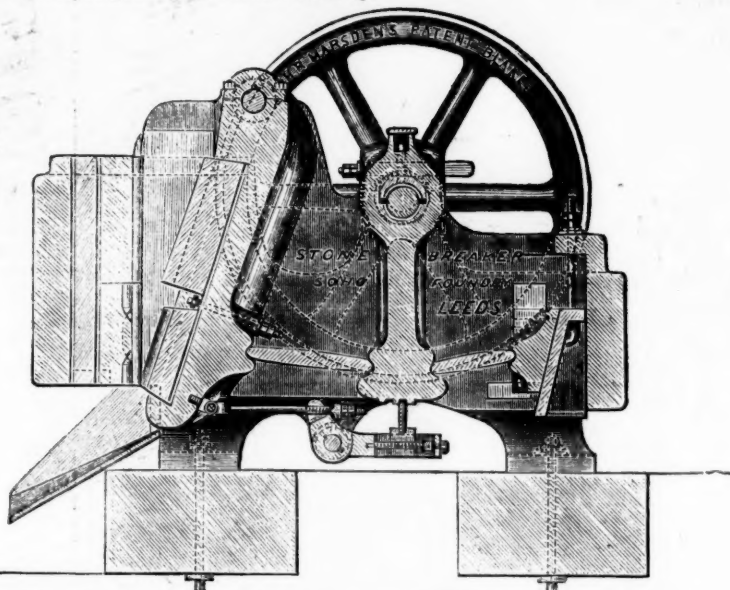
BLAKE'S NEW PATENT STONE BREAKER.

H. R. MARSDEN,
ORIGINAL PATENTEE, AND ONLY MAKER IN THE UNITED KINGDOM.—2000 IN USE.

These Machines are in extensive use amongst the Tin, Copper, Lead, and other Mines, and are showing a clear saving of 4d. and 6d. per ton over the ordinary mode of hand spalling, besides a diminution of stamping power equal to 30 per cent., which is a considerable saving. They are already well known to the mining world, and can be seen in operation at some of the leading Cornish and other Mines. For breaking the elvan rock they have established a decided supremacy over other Machinery.

Exclusively adopted by Her Majesty's Government, and by most Continental Governments.

Machines for Hand and Steam Power, specially designed and largely used for Crushing Pyrites, Limestone, Cement, Coal, Rocks, Ganister, &c., at all the principal works in the Kingdom.



Used by all the Great Mining Companies in the World, and are shown by Testimonials to effect a Saving of FIFTY per cent. over every other system.

Awarded 62 Gold and Silver Medals:—

Paris, 1867.
Santiago, 1869.
Leeds, 1875.
Leicester, 1868.
Cardiff, 1872.
Bolton, 1872.
Ayr, 1873-4-5-6, &c.

EXTRACTS FROM TESTIMONIALS.
"They occupy an important position as labour-saving Machines."—*Architect*.
"The Machine is well designed, simple, but substantially made, and is capable of reducing any material to fine gravel, such as copper ore, and is certainly preferable to the stamps in use for that purpose."—*Mining Journal*.
"Your Machine will crush from 60 to 120 tons of hard limestone per day of 10 hours."

This illustration shows my new patent REVERSIBLE Cubing Jaws, which are made in upper and lower sections, and the backs planed, so that when the bottom part of the lower section becomes worn it can be turned upside down, and thus made equal to new. This process does not require the aid of skilled labour, the white metal being entirely dispensed with.

THESE JAWS WILL WEAR FOUR TIMES longer than any other, and they can be renewed at a fractional cost.

"No Machine is equal to yours, combining as it does very great power, simplicity of construction, and cheapness."
"Mr. Marsden's Stone Breakers are so thoroughly well known and appreciated that it is unnecessary for us to describe their construction or speak of their merits."—*Engineering*.
"By the use of your Machine we have reduced the cost of breaking and forming road material to one-half its previous cost."
"Our 15 by 7 Machine has broken 4 tons of hard whinstone in 20 minutes for fine road metal, free from dust."

CATALOGUES, TESTIMONIALS, &c. (in the French or German language, if required), on application to the sole maker of "Blake's" Stone Breaker:—

H. R. MARSDEN, SOHO FOUNDRY, LEEDS, ENGLAND.

The Barrow Rock Drill COMPANY

Are NOW PREPARED to SUPPLY their DRILLS, the ONLY ONES that have been SUCCESSFULLY WORKED in the MINES of CORNWALL. At DOLCOATH MINE, in the HARDEST known ROCK, a SINGLE MACHINE has, since its introduction in July, 1876, driven MORE THAN THREE TIMES the SPEED of HAND LABOUR, and at TWENTY PER CENT. LESS COST PER FATHOM.

In ordinary ends two machines may be worked together, and at a proportionately increased speed. They are strong, light, and simple, easily worked, and adapted for ends and stopes, and the sinking of winzes and shafts.

The company are also prepared to SUPPLY COMPRESSORS, and all necessary appliances for working the said Drills.

Apply to—

LOAM AND SON,
LISKEARD, CORNWALL.



By a special method of preparation, this leather is made solid, perfectly close in texture, and impermeable to water; it has, therefore, all the qualifications essential for pump buckets, and is the most durable material of which they can be made. It may be had of all dealers in leather, and of—

I. AND T. HEPBURN AND SONS,
TANNERS AND CURRIERS, LEATHER MILLBAND AND ROSE PIPE MANUFACTURERS,
LONG LANE, SOUTHWARK, LONDON
Prize Medals, 1851, 1855, 1862, for
MILL BANDS, ROSE, AND LEATHER FOR MACHINERY PURPOSES.

Now ready, price 3s., by post 3s. 3d., Sixth Edition; Twentieth Thousand Copies much improved, and enlarged to nearly 300 pages.

HOPTON'S CONVERSATIONS ON MINES, between Father and Son. The additions to the work are near 50 pages of useful information, principally questions and answers, with a view to assist applicants intending to pass an examination as mine managers, together with tables, rules of measurement, and other information on the moving and propelling power of ventilation, a subject which has caused so much controversy.

The following few testimonials, out of hundreds in Mr. Hopton's possession, speak to the value of the work:—

"The book cannot fail to be well received by all connected with collieries."—*Mining Journal*.

"Its contents are really valuable to the miners of this country."—*Miners Conference*.

"Such a work, well understood by miners, would do more to prevent colliery accidents than an army of inspectors."—*Colliery Guardian*.

London: MINING JOURNAL Office, 26, Fleet street; and to be had of all book-ellers.

THE GREAT ADVERTISING MEDIUM FOR WALES.
THE SOUTH WALES EVENING TELEGRAM
(DAILY), and
SOUTH WALES GAZETTE
(WEEKLY), established 1857.
The largest and most widely circulated papers in Monmouthshire and South Wales.
CHIEF OFFICES—NEWPORT, MON.; and at CARDIFF.

The "Evening Telegram" is published daily, the first edition at Three P.M., the second edition at Five P.M. On Friday, the "Telegram" is combined with the "South Wales Weekly Gazette," and advertisements ordered for not less than six consecutive insertions will be inserted at an uniform charge in both papers.
P. O. O. and cheques payable to Henry Russell Evans, 14, Commercial-street, Newport, Monmouthshire.

MINING PROSPECTUSES AND ANNOUNCEMENTS OF PUBLIC COMPANIES should be inserted in the BARNSTAPLE TIMES, published every Tuesday, and in the DEVON POST, published every Saturday, as these papers circulate largely throughout Devon and Cornwall, where many thousands of investors reside. Legal and Public Companies' advertisements, 6d. a line each insertion; Trade and Auctions, 4d. a line; Wanted, &c., 20 words, 1s.
Published by J. B. JONES, Boutport-street, Barnstaple, Devon, to whom all orders by post or telegraph should be sent.

BRYDON AND DAVIDSON'S ROCK DRILL.

SELECTED BY THE BRITISH AND OTHER GOVERNMENTS.

Reduced prices of this Rock Drill (formerly called "Kainotomon"), Nos. 1 and 2, £32 and £34. SUBJECT TO DISCOUNT.

IMPROVED AIR COMPRESSORS.

Makers of Pumping and Winding Engines, Steam Hammers, Boilers, Pump Pipes, &c., &c. Castings of all kinds.

BRYDON AND DAVIDSON, ENGINEERS,
WHITEHAVEN.

ORMEROD, GRIERSON, AND CO.,

ST. GEORGE'S IRONWORKS, MANCHESTER,

Engineers, Millwrights, & Boiler Makers,

MANUFACTURERS OF

Stationary Steam Engines and Boilers for all purposes, Mill Gearing, Sugar Machinery, Cranes, Turn-Tables, and Railway Fixed Plant of all descriptions; also, the Diamond Rock Boring Company's Plant—viz.: Compressed Air and Air-Compressing Engines, Prospecting Machines, Tunnelling Machines, and Shaft Sinking Machines.

HYDRAULIC PRESSES OF VARIOUS KINDS.

Have the Largest Assortment in the Trade of

PATTERNS,

WITH MACHINE-CUT TEETH, OF

SPUR WHEELS, BEVEL WHEELS,
MITRE WHEELS,

ALSO

FLY WHEELS.

DRIVING PULLIES & DRUMS.

CAN BE SUPPLIED BORED AND TURNED IF REQUIRED.

CATALOGUES ON APPLICATION.

LONDON OFFICES:

No. 5, WESTMINSTER CHAMBERS

VICTORIA STREET,

WESTMINSTER, S.W.



Porter's Governor for Stationary Engines. Also Governors on the same principle adapted for Marine Engines.